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SBS launches its first satellite

SATELLITE Business Systems had its first satellite launched by NASA from Cape Canaveral last weekend, in preparation for offering integrated voice and data networks to private companies early next year.

After taking 24 minutes to get up, it will slowly work its way towards its final position in geostationary orbit 22,250 miles up 106 degrees west of Greenwich, ready to start carrying test traffic in about a month.

SBS expects the satellite's capacity of 480Mbps to be taken up within a year and its second satellite is due to go up next April.

General Motors is the latest of 11 customers to be announced. Others include Westinghouse, Boeing Computer Services and several insurance companies, as well as IBM and Aetna Life and Casualty which own SBS in partnership with satellite operator Comsat.

Live traffic is due to be carried early next year. Customers can lease channels of up to 1.5Mbps capacity and it is planned to implement channels of 3.5M and 6.3Mbps capacity when they are requested.

The system uses time division multiplexing with dynamic allocation of the capacity and is said to be suitable for voice, data, facsimile and some types of video traffic.

NEWS IN BRIEF

DAP first foreign order

ICL has picked up its first overseas order for the Distributed Array Processor. The as yet unnamed customer is described as "a public body located outside Europe".

It will use the DAP with a 2982 mainframe for meteorological and image processing applications. The machine ordered will have a 64 x 64 array like the DAP already in operation at Queen Mary College in London.

ICL said that the customer was not in the US.

Streaker debut

A MAGNETIC tape drive called Streaker, and another known as Streamer are to be marketed in the UK by CIU Computers of Woking under an agreement with the manufacturers, Data Electronics of the USA. Intended as back-up to fixed disc media, Streamer is capable of a 90K-bytes per second transfer and has its own formatter/controller subsystem, while Streaker has no such facility.

Back-up growth

AMERICAN research company BCC issued a report predicting 46 per cent annual growth in the back-up storage market. Although discs are indicated as the key 1980-1986 growth area, a tape revival is forecast for archive back-up.

New standard?

THE International Standards Organisation's seven-layer architecture for open systems Interconnection has been registered as a draft proposal for an international standard and a document prepared at the architecture working group's meeting in Berlin last week will be circulated for comment to national standards bodies next month.

Unions hold fire on ICL sackings

MAJOR clerical and technical staff unions are to meet ICL on a national level next Monday in a bid to persuade the company to reconsider its plan for redundancies at manufacturing centres like Winsford, where 1,500 jobs are under threat.

Representatives of the unions, including ASTMS, APEX, AUEW (TASS), ACTSS and ESSA, met this week to consider the company announcement, but agreed to defer direct action against ICL.

Their respective research departments will draw up a report listing major points of concern.

Last week, workers at Winsford occupied the plant briefly as a protest against the redundancies.

Commenting after this week's meeting, Tim Webb, national officer of ASTMS, the largest union involved, said: "Obviously our main concern is that ICL is moving away from being a manufacturing base and leaning more towards franchise."

Delay

"This is a national level issue relating to company policy. We want the company to delay making the cutbacks until the points which will be made in our report have been considered."

Explaining ICL's decisions to close the Winsford plant and to seek other manufacturing redundancies, ICL deputy managing director Peter Ellis said last week that new technology was reducing the labour content in ICL's manufacturing sector by about 30% a year while hardware shipments were now expanding by about 15% annually.

Ellis pointed out that the hardware shipments growth rate of 25% a year achieved about two years ago had enabled ICL to avoid major redundancies in the past.

Curry's hits back

CURRY'S Microsystems has denied the suggestion made by former director Robert Webb that sales of its business systems are failing to live up to expectations (CW, November 6).

Colin Sandford, group commercial director of Curry's, said that it was too early to start drawing any conclusions about sales, since the Panasonic system had only been in the shops since mid-September and the company's other business system, the Micro-C 2000, had only just reached many of the Micro-C shops.

None of the shops was prepared to comment on the level of sales, but Webb stands by his allegations.

Sperry chooses Z8000

THE choice of Zilog's Z8000 16-bit microprocessor by Sperry Univac for use in future terminals, communications products and computer systems marks another commitment by a mainframe manufacturer to a specific 16-bit microprocessor.

Several other mainframe companies have already announced commitments to the 16-bit devices now available, which include Motorola's 68000 and Intel's 8086, as well as the Z8000. Olivetti has also chosen the Z8000.

The existence of Advanced Micro Devices as second source to the family is reported to have been the major factor in the decision. Another factor was that Univac has been a major customer for Zilog's 8-bit device the Z80.

Evaluation between the three main processors is reported to have been going on for several months and has involved extensive presentations by the suppliers. Univac plans to use the Z8000 in products produced by the General Systems division in Salt Lake City which could appear on the market next year.

Advantages

AMD has its version of the Z8000 available now, whereas second sources for the other two have not yet appeared. Mostek does not expect to have second source parts of the 8086 until the middle of next year, and Rockwell is thought to be having problems second sourcing the 68000.

Univac believes that the Z8000 is easier to program than the two alternatives and that it has a more practical register scheme.

Zilog has announced recently two extensions to the CPU range in the Z8000 family, (CW November 6), the 6MHz Z8003 segmented virtual processors and the Z8004 unsegmented part and equivalent 10MHz parts.

Range extended

GENERAL ROBOTICS has extended its range of LSI-11 based microsystems to include eight-inch Winchester disc options for the Gemini and Tristar, a 90Mbyte storage module for the Pegasus, LSI-11/23 options for the complete product line and a four port serial interface. The products are available from UK distributors Wilkes Computing.

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MP slams 'misuse' of state computer

BIRMINGHAM MP Jeff Rooker (Lab, Perry Bar) is to raise in the Commons the use of a State industry's computer to support a private health scheme. Rooker said the decision to allocate time on the Midland Electricity Board's IBM 3032 to collect contributions to the Private Patients Plan was a "disgraceful misuse" of public money which undermined the interests of National Health Service patients.

He has written to Energy Secretary David Howell asking if the board's promotion of a private health scheme falls within its legal powers. The question will be asked in the next session of Parliament.

The board's deputy chief accountant Gordon Sands said the scheme was merely another voluntary deduction from salary like those for safety footwear and private insurance. Each employee from the chairman down was offered membership of the scheme, which he was entitled to refuse.

He added that the board had been with the BUPA private health scheme for nearly 20 years and made deductions for it for many years. This year the board had negotiated what it believed to be a better scheme and the matter had been discussed formally with local trades unions in August.

Union calls for cancer safeguards

THE Banking Insurance & Finance Union has passed a resolution calling for immediate safeguards for operators of IBM's 3800 laser printers and photocopiers. This follows US experimental findings indicating a potential cancer risk from the substance trinitrofluoranone (TNF) which is used in these machines.

The safeguards include the individual's right of refusal to operate the machines, frequent medical checks and provision of protective clothing.

Racal gears up for joint CMOS launch

● From front page

ready developed prototypes of the process which is about to be transferred to the expanding GIM Glenrothes facility in Scotland.

First part of the three-year plan is to start process running with geometries of five microns. Besides manufacturing its own products, GIM will be mass producing the ULA chips for Racal, who will then commit them at the Reading facility.

Second part of the plan is to shrink the technology down to two to three microns, enhancing the performance and density even more.

One reason why both companies decided to develop their own silicon gate CMOS was because of this shrinking requirement. Others on the market, like ISOCMOS from Mitel and LOCMOS from Philips, may not shrink down to the two micron dimensions.

The third and last part of the plan so far is to incorporate analogue circuitry on to LSI and VLSI devices.

Racal has been making ULAs, a type of custom designed chip which can be produced cheaply in low quantities, for three years. The company wants to satisfy a demand for ULAs using this advanced technology, which begins to question microprocessor preference over custom chips.

ULAs are much faster than microprocessors, 10-15MHz, and using the silicon gate CMOS will have a much lower power consumption. Up to now the only disadvantage has been redundancy, which is inherent with the design process.

Integrated computer aided design packages are developed and used in-house by Racal in the design of the ULAs. Dr Gary Vanstone, director-in-charge at RMS, foresees a large market for CAD equipment and packages.

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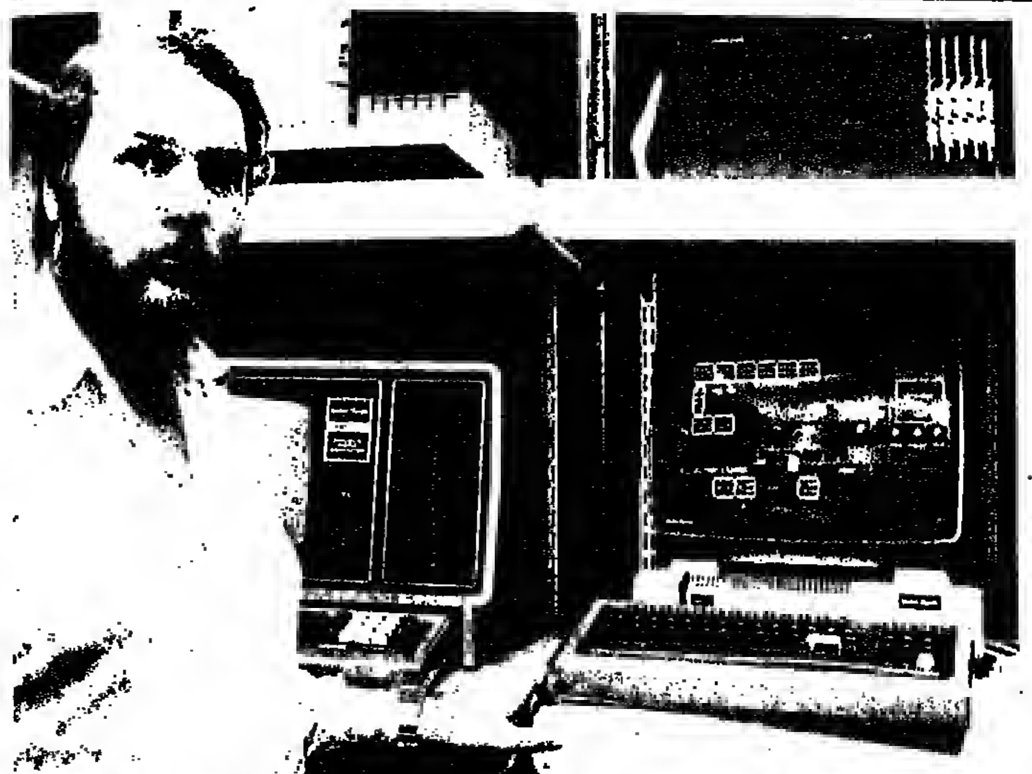

The disputed Dominoes program, demonstrated by Brian Moore of P J Equipment, an authorised dealer.

Surprise win for RCA in £6m deal for 60 ops

by Kevin Cahill

THE biggest prize currently available in the UK contract market has been won by non-contract supplier RCA Services. The job, worth £6,000,000, is to supply 60 plus operators to the European Space Agency for its European computer centres.

The order is a major coup for Sunbury-on-Thames based RCA, and succeeds that held by Knight Computer Services, the BOC Datasolve subsidiary which withdrew from the contract in July following difficulties with the German tax authorities.

Industry sources expressed surprise that an order of this size had gone to RCA, which is not widely known in the contract operator market. But RCA points out that it already has a series of agreements for maintenance and servicing of equipment at ESA sites on the continent.

And Richard White, one of the managers responsible for the contract at RCA, says that the job will be staffed by RCA personnel, not contract staff.

In some cases RCA would be offering employment to the existing operators, who would be joining the staff of RCA.

Knight did not tender for a renewal of its contract, and has an agreement with ESA not to comment to the press on aspects of it which led to Knight severing contacts with its operators two months ago.

RCA won the contract against competitive bids from other companies. These included Resource Technology from Bushey, whose boss Ian Penman, commented: "It is wrong to award European jobs to American companies in the middle of a recession in Europe. The dollar is very cheap in relation to the pound and mark. This gives the Americans an unfair advantage."

The European Space Agency replied that RCA had been established in the UK since 1936 and all the jobs would be going to Europeans.

Penman indicated that he would be taking the matter up with his MP.

The ESA has a range of ICL 2980s System 4/71s, and IBM equipment. The bulk of the staff will work at the ESA headquarters in Darmstadt, Germany.

Domino program leads to more copyright action

by Claire Gooding

ANOTHER row has broken out between micro software dealers Molimerx and Kansas City Systems over an alleged violation of software copyright.

Kansas City Systems is selling a domino-playing program for the Tandy TRS 80 which A. J. Harding of Molimerx claims is a copy of "Dominoes" marketed by his company.

Harding's solicitors have written a "before action" letter of protest to Tom Crossley of Kansas. Harding told Computer Weekly that in the absence of a satisfactory reply he would seek to extend the injunction granted recently by Justice Graham over Kansas' unauthorised use of Molimerx's Level III Basic (CW, November 13).

The row stems from a discovery made by the author of Dominoes, computer service engineer Barry Dunn, who sold his program to A. J. Harding and gets a 20% royalty on each copy sold by Molimerx.

Interested to compare the new version with his own, Dunn ran a copy of Kansas' domino game (bought by a friend through mail order) only to find it almost identical.

He confirmed it as his own program by finding the unerased "watermark" by which A. J. Harding identifies its products.

"The coding is recognisably mine. Even the variable names and the screen display are the same that I used" Dunn told Computer Weekly.

"The only thing that has changed is the set of screen instructions to the user —and even that's been done incompetently," he said.

Kansas' version of the program gives an unlisted error should the users try to pass the request for his name without entering any alpha input.

Dunn explained that the printlines containing screen in-

● Turn to page 40

Amdahl rival for H-series

MICROCODE is used extensively in the 580, Amdahl's answer to the first IBM H-series machine, the 3081, which was announced last week (CW, November 20).

While moving away from the much less flexible hardwired structure of its existing 470 series computers, Amdahl has retained two other features — air cooling and a uniprocessor architecture. At £2 million for a 16-megabyte, 16-channel machine, the price-performance of the 580 looks similar to the 3081.

The 580 offers more than twice the power of the existing Amdahl top end computer, the 470V/8, but is only two-thirds the physical size and dissipates only two-thirds of the heat. But in contrast to the 470s, which were twice as cool as earlier IBM mainframes, the 580 is slightly less cool than the 3081.

Peter Williams, managing director of Amdahl UK, believes that the 3081 only uses water cooling because the design decision was made by IBM five years ago.

The uniprocessor architecture of the 580 will enable it to run the Airline Control Program, a facility that cannot be provided by the dual processor IBM 3081. So Amdahl's chances of breaking into more IBM based airlines around the world will be improved.

● Turn to page 40

IBM three-stage launch programme

THE operating system supporting the IBM 3081 is to be MVS/SP Release 1 which supports the existing 3380 and will be available for the 3081 in June 1981.

Release 2 of MVS/SP is due in July and will provide cross-memory services and Global Resource Serialisation, a technique by which a failed processor will be "put out" automatically and have its workload shifted without interruption to other processors.

Further innovations are planned for Release 3 in November 1981, which are designed to increase performance and reliability. The plan is to achieve this by microcoding, using less storage and reducing processor time expended in paging.

Release 3 will apply to JES2 and JES3, and includes features such as data streaming.

An IBM spokesman described the announcements as "minor enhancements, evolution rather than revolution".

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JOB OPPORTUNITIES: Pages 18-37

BRIEFING . . . BRIEFING . . . BRIEFING

2,500 staff get notice

ICL served redundancy notices to 2,500 staff on Tuesday, despite strong pressure to reconsider its cutback policy from the technical and staff unions involved.

The company is considering proposals made by the unions at a meeting on Monday.

The two sides will meet again on December 12.

Commodore plans

COMMODORE International is moving into the electronic cash register business next year, and has also announced plans to set up an integrated circuit plant in Europe. Its latest venture is in the low-cost personal computer market. See Micro News, page 9.

US copies Europe

IN a rare example of the US following the lead of Europe, IBM has just opened its first retail store on the other side of the Atlantic. Located at Philadelphia, the US store will sell a similar product range to the nine outlets already set up in Europe. Products include word processors, PoS terminals and the 5120 desk computer.

Amdahl for Shell

AMDAHL has broken into another major multi-national company with its first order from oil giant Shell. The data processing division of Shell Nederland BV in Den Haag has ordered a 12-megabyte 470V/7 which will be installed in January next year.

Answer delayed

BURROUGHS has admitted that the B3950, announced in April last year as its answer to the IBM 4300 series, has still not met specification. The company is unable to say when 3950 deliveries will start and is shipping an "extended" version of the 2900 in its place. The main problems appear to be with instruction pre-fetch code.

Memorex appeal

MEMOREX is undeterred after losing its recent appeal against the US Federal Court's decision in its marathon anti-trust suit against IBM. Three US Ninth Circuit Court of Appeals judges upheld the District Court verdict favouring IBM, reached in the original 1978 trial. Now Memorex will seek an "en banc" hearing before the Ninth Circuit, which means re-consideration by a 10-15 strong panel of appeal judges.

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Vol. 29 No. 735
Thursday, November 27, 1980

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IPC Electrical Electronic Press Ltd, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS. Telex: 892084 BISPRS G

Branch Offices:
Birmingham: Lyndon House, 202 Walsall Road, Birmingham B42 1BA. Telephone 021-356 4038.

Manchester: Grove House, Skerton Road, Old Trafford, Manchester M16 0WL. Telephone. 061-872 8861.

New York. 205 East 42nd Street, New York NY 10017 Tel: (212)-2121 867 2080

Published weekly on Thursday.

Registered at the Post Office as a newspaper. Price per copy 25p

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Controlled circulation department: IPC Business Press (Sales and Distribution) Ltd, 40 Bowling Green Lane, London EC1R 0NE. Tel: 01-837 3636. Subscriptions (one year) for readers outside the above categories: UK £18, UK Students £9, overseas £30, overseas students £15, US and Canada $78, US and Canadian students $39. Back number price 75p. Airmail to Middle East or North Africa £46.30. Airmail to rest of Africa, North and South America or South Asia £51.84. Airmail to Far East or New Zealand £57.40. Applications for subscriptions should be sent to: IPC Business Press (S&D) Ltd, Oakfield House, Perrymount Road, Haywards Heath, Sussex. Tel: 0444 59188

ISSN 0010-4787

COMPUTERVIEW

The old, old story

MANY companies in Britain still seem unaware of the importance of applying microprocessors to new products, says a newly published report from the Policy Studies Institute (see facing page).

If you feel this has a familiar ring, you are right. It is the same message that has been publicised repeatedly in the national Press for over three years.

"New technology must be introduced faster." "Industry warned not to fall behind in automation." "Microelectronics awareness in UK dangerously low," shout the headlines.

For three years past, hardly a week has gone by without an authoritative report being published or a speech being made chiding British industry for its failure to take new technology on board.

They are three years in which television has added its warning of the dangers and illustrated the potential and absolute necessity of incorporating microelectronics into new products and production processes.

In view of the help that many of our overseas competitors have received to increase awareness and spur introduction of microelectronics, no one could accuse the government of either alacrity or generosity on this issue.

It seems doubtful whether the present administration would have initiated an awareness and financial aid programme at all, but government has had a policy all the same. The Microprocessor Application Project has been running flat out for more than three years.

The spate of "new technology" reports in the Press and on television dates roughly back to the opening of the MAP scheme, a scheme which began as a later 1970s response to widespread concern over the slow rate of take-up of microelectronics (as an applications technology) compared to overseas competitors.

A DoI survey in 1977 showed that only about 5 per cent of UK companies demonstrated an awareness of the potential of microelectronics.

More than three years and £21m later — the latter spent variously on increasing awareness, training, and consultancy and project support — there still remains, incomprehensibly, an army of unconverted.

The Policy Studies Institute found them even in firms with competitors that had already put microprocessors into their products.

PSI was told by several senior managers with responsibility for technical development that a major obstacle to vigorous development of microprocessor applications was lack of interest, or open opposition, from members of the board, particularly from those with a non-technical background.

Indeed, some rated boardroom ignorance and opposition as the most important single factor holding up progress, and contrasted continental companies which, they claimed, were more often directed by people with technical rather than financial backgrounds.

Although it quotes these views, the PSI Report devotes far greater space to the analysis of another set of problems centred on reasons why even those manufacturers who have taken note of microelectronics are still lagging behind.

Among others, it lists high development costs; lack of specialist technical expertise; difficulty in getting supplies of chips; problems with software; the inability to find sufficient suitable input and output devices.

The report does not search for the reasons why these, or perhaps a different but equally difficult set of problems, have been surmounted by our competitors. It should, because it seems likely that the answer once again comes back to the aforementioned ignorance and opposition by senior management.

It has been suggested that managers with engineering backgrounds are more inclined to take a long-term attitude to technical innovation. The time has gone when one could centre decisions on short-term capital return. The question to be asked by any manufacturer considering the adoption of microelectronics is one requiring a simple "yes" or "no" answer.

Can my company continue to stay in business with products that do not incorporate microelectronics? A negative response should go a long way to dismantling the barriers that are being encountered.

LETTERS to the EDITOR

In defence of TOPS

HAVING allowed the dust to settle over the controversy about TOPS computer programming students and their apparent inability to obtain employment, I write to defend the existing training scheme.

We run two courses a year taking a maximum of 18 students per course. Each student undergoes two aptitude tests. If successful, he or she has an interview jointly run by the TSD and ourselves.

The interview assesses motivation and suitability and we test about 100 applicants to obtain a class of 18 students.

Our course structure ensures that the bulk of the course is in the workshop. The students deal with professional programmers who are still in or have recently been in the business. After 18 weeks, our "finished product" appears to be in demand locally.

We ask students to contact us when they have obtained work and for several years over 93 per cent have reported becoming employed in the programming business.

Generally, the remaining 7 per cent do not report or revert to their previous occupations. Local firms canvass us when a class is finishing to interview the students; there are no agency fees and employers are very happy with the "product".

Our last course seemed to find it harder to obtain employment quickly but up to now 13 of an original 15 have obtained employment; even in these difficult times work is still available.

We consult local employers about modern programming methods and try to give the students facilities and experience approximating to the real world despite local government restrictions on expenditure and budgets.

I hope this letter will give students a somewhat different picture from that created by previous correspondence about training and prospects for TOPS students.

T. V. MOSS
Principal Lecturer in Computing
Guildford County College of Technology.

Bargain at the price

MY COMPANY is involved in TOPS training and we invited a broad cross-section of computer-using industry to a series of recent seminars in Birmingham. The purpose was to test whether our training matched industrial requirements.

At one seminar we attempted to define overall costs of recruiting an experienced programmer. Coincidentally, figures from the floor provided an analysis which yielded an estimate of over £2,300.

We cannot accept Mr Wood's estimate of further training costs; even if it were true, a well-trained TOPS graduate would still be a bargain at the price.

D. F. BOLLEN
Managing Director
Compucentres International, Birmingham.

This correspondence is now closed — Editor.

You were not alone

I REFER to your page 3 article (CW, November 13) headed "First agency to go on show" and would point out that despite what Mike White of Effectia Gravis says, another agency appeared at Compec.

That was Sales and Marketing Recruiters Ltd, which specialise in recruiting sales and sales support people in the computer industry.

ALASDAIR SCOTT
SMR Sales and Marketing Recruiters, London W1R 7HB

Apparent lack of control

HAVING set up and established TOPS-sponsored schools in Harrow and Glasgow in the last four years, and opened two more in Preston and Birmingham, I can reply with some experience to the sad story of T. A. Honson (CW, October 28).

Contracts awarded by MSC are on the clear understanding that there shall be selection, training "and placement" or taxpayers' money is wasted. What concerns me is the apparent lack of control exercised by some course presenters in monitoring placement in sufficient detail.

We know that there can be conflict between the elements of government agencies but it is the clear responsibility of course presenters to control the situation.

I advise Mr Hanson and other frustrated TOPS graduates to hammer their training establishments for the help and advice needed; that is what they are paid for.

I am engaged in current negotiations with potential employers for candidates who completed the last course. If this is not done, this otherwise excellent scheme is downgraded by misunderstanding on both sides.

ROBERT MOSCROP
Education director
James Ross Associates, Leyland, Lancashire.

TEN YEARS AGO

From Computer Weekly of November 26, 1970.

MORE than a dozen employees of Unilever Computer Services Ltd's southern centre at Wembley are to be laid off . . . Control Data Corp says that its supercomputer, the Star-100, has now reached a point where design goals are being exceeded . . . A contract just signed between Gemini Computer Systems and Systems Development Corp of the US represents the latest move in Gemini's bid to become the leading pan-European software house . . . A third European manufacturing plant is to be established by Hewlett-Packard on a 45-acre site at Grenoble, France where up to 3,000 will be employed eventually.

Motivation keynote

AS A small employer of programmers trained on TOPS courses, I should like to add my views to the current correspondence in Computer Weekly.

My first contact with TOPS trainees came when I employed secretaries several years ago. I found TOPS graduates with commercial experience derived from totally unrelated fields more valuable in terms of initiative, application and capability than people who had been through the standard mill of secretarial college.

I find the same considerations apply to computer staff, whose motivation and capacity to learn is far more important than their existing knowledge.

It is obvious that TOPS computing courses vary widely. One has only to examine application forms submitted from students on some courses to realise that selection procedures are totally inadequate in certain cases.

I advise an employer of junior computer staff to identify a suitable course where selection procedures and training are adequate, meet the course tutors and understand their objectives.

D. A. CLIFFORD
Director
Micro Logic Consultants, Wisborough Green, W. Sussex.

1984 and all that . . .

FIRST of several readers who sent in cuttings of this week's example of the strange things people say about computers was D. D. Cranch, of St. Sampson's, Guernsey, who wins £5.

Out-of-work TV engineer Kevin Roscoe has had a windfall from the Department of Employment — a Giro cheque for 1p. It arrived at his home in Banbury, Oxfordshire in a first-class envelope and now 23-year-old Kevin has had it framed. He said: "All we hear about at the moment is Government cuts, yet they waste money like this. Why couldn't it have been added to my payment a few days later?"
An employment department spokesman said: "We are linked to a computer which cannot differentiate between 1p and £100. In the old days it would have been added to the next payment."

Daily Mail

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UK lags in use of micros in industry

MANUFACTURERS must become more aware of the dangers of failing to respond to new technology, or they will become decreasingly competitive internationally. A study carried out by the Policy Studies Institute in London on Microprocessors in Manufactured Products confirms that the UK is falling behind many of its competitors in the application of microprocessors to new products.

About 90 companies in five different industries, including domestic electrical appliances, heating and ventilation equipment, cars, testing equipment and toys and games, were investigated by the team from PSI.

Grants

Opposition to the new technology tended to come more from management than from the shop floor. Most of the companies expected to increase sales, output and employment as a result of using integrated circuits.

Although grants are available through the MAP (Microprocessor Application Project) and MISP (Microelectronics Industrial Support Program) schemes which were set up in 1978, the cost and delay of getting involved in them tended to offset the value of the grants.

Companies which get the grants are reported to be finding it difficult to acquire the engineering expertise needed to exploit fully the microprocessor.

Trial date set

THE date for the long-awaited trial of Telecomputing's £2.5 million claim against ICL has been set for October 26, 1981. It is expected to last for 15 days. On Wednesday next week Telecomputing and ICL will appear in the High Court to argue Telecomputing's case that ICL must hand over more documents as part of the discovery process.

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Solitary sale for Improve in US operation

ONLY one customer for CAP-CPP's Improve software product range for IBM users has been picked up so far by the US marketing operation acquired by Insac from Altergo early this year. This is the organisation that has been renamed Insac Products Inc (CW, October 9).

CPP managing director Tony Price, who is seeking to boost current European operations through close ties with a plug-compatible hardware vendor, described the US performance of Improve as "disappointing".

Boost

He added that Insac Software Inc had been expected to pick up two or three Improve customers a month since active selling started in July.

Insac Software Inc president Peter Dine agreed that there were problems with Improve and added that they were under investigation.

Four of the five Improve products are aimed at DOS users and Dine thought that the increased capacity offered by the 4300 family had reduced the level of interest in performance-improving software.

Price believed that a more serious problem was the remoteness of the US salesman from the UK-based Improve support centre.

Dine pointed out that Improve was not selling well anywhere at the moment, although CPP has attributed its contemporary lack of success in the UK to lack of sales staff experience with Improve.

Asked if Insac's agreement with CPP would be affected if it were acquired by a US-based PCM, Dine said that Insac's five-year licence to sell Improve was exclusive and that there was no immediate intention to drop the packages.

Dine said that Altergo's Shadow was still selling well in the US following Insac's acquiring Altergo Software Inc.

CAP puts CPP on market

CAP-CPP believes that its IBM software products arm CPP (Computer Program Products) could prove a useful acquisition for a plug-compatible hardware vendor. Its software packages would enhance and complement the PCM's hardware and its sales force could pick up valuable market intelligence.

Cooperation

Based at Richmond (Surrey), CPP's 40-strong workforce includes support and development staff as well as sales personnel.

CPP managing director Tony Price said that co-operation with a PCM was being considered as instead of outright acquisition but refused to reveal which PCMs were under consideration.

Price did indicate a lack of response from the firm that supplied CPP with an IBM-compatible system earlier this year.

Harris launches 24-bit mini

HARRIS Systems has formally launched the first machine in its 24-bit minicomputer family to be aimed at the OEM market as well as at end users. Called the H80, it costs about £45,000 and the complete configuration, apart from VDUs, comes in a single cabinet covering four square feet of floor space. It includes an 80-megabyte Winchester disc drive and a streaming tape drive. The H80 is software compatible with the bigger Harris minis and runs under the virtual memory operating system, Vulcan.

Iraqi order

IRAQ last week placed a $150 million order with Thomson CSF of France for 27 electronic telephone exchanges providing a capacity of 315,000 lines. Thomson has also won smaller contracts with Lebanon and Argentina for switching systems and facilities for local manufacture, and with Chile for a turnkey network of 27 electronic exchanges providing 153,500 lines, with multiplexing and microwave transmission equipment, to be operational in 1984.

Investors sought for NEB venture

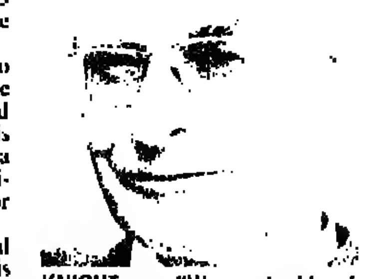
THE National Enterprise Board wants British businessmen to invest in US "advanced technology" companies willing to manufacture here, as part of a £25 million programme to stimulate development areas.

It is looking for investments to swell a £2 million NEB fund to be managed by a jointly-owned Anglo-American company. This will be headed by Jack Melchor, a US financier and member of President-Elect Reagan's task force for innovation and entrepreneurship.

The £2 million in the so-called Anglo-American Venture Fund is small in comparison with the NEB's £50 million interest in Inmos, but Melchor is keen to limit the amount as he will be employing his "seed corn" investment techniques, which have been highly successful in the US but are as yet untried in this country.

NEB chairman Sir Arthur Knight commented: "We are looking for advanced technology entrepreneurs and want to get the maximum possible amount of money in."

Based in Manchester and Los Altos, California, the Anglo-American Venture Management Company will seek out US technological developments which can be "further exploited" over here in the assisted areas of the North and South-West.



KNIGHT . . . "We are looking for advanced technology entrepreneurs."

A number of US firms have already been approached by the company.

Inquiries should be addressed to: Richard Shepherd, Anglo-American Venture Management Ltd, Century House, 7 Tib Lane, Floor 6, Manchester M2 4JX. Tel: 061 834 6406.

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Downtime

by Chad

Who'll be first for the latest acronym?

ARE you a keen follower of developments in OOH? Those in the know, always ready with the latest jargon, are of course aware that OOF means Office of the Future, an interesting concept for speculation if you don't have to worry too much about reality.

Television people have been jumping at every chance to film electronic office systems and call them "paperless", even if they are manifestly not so.

Still, we can dream, can't we? That's why I referred to the Paperless OOF at a conference the other day, and was promptly corrected by a young lady who insisted I should call it POOF.

Well, folks, is this how a new acronym appears in the language? Who's going to be the first to use it?

● ON our canteen menu for lunch the other day was "Roast lamb and mince sauce". It tasted just the same as ever. Do you suppose someone has invented a voice recognition word processor, despite this newspapper's scepticism?

One-sided conversation

LAST week, the technology of telephone answering machines; this week the social impact. (We're nothing if not thorough on LW).

A friend of mine has one of these machines (and it works satisfactorily, would you believe) and an incident with another party has brought home to me how much people need to readjust their psyches to survive in this wonderful electronic age.

A lady acquaintance wanted to get something from the chap with the machine, and rang to see if he was in.

His machine said, "I'll be back at 3.30." Fine, thought the lady in her innocence, and walked the mile and a half to his house at the appropriate time.

Was he there? No, he wasn't. He hasn't bothered to change his announcement tape in weeks.

Now, you or I know, in our technical sophistication, how easy it is to forget to make sure such things as that announcement are correct. We would have phoned again at 3.30 just to make sure (wasting some more money in the process – an ordinary phone would just not answer, giving us the information we require for free).

The lady has not yet learnt technical cynicism – that which makes you hover ready to grab the cup when it inevitably jams in the coffee machine.

This is, I must admit, speculation, that I would not believe the machine. The first time I heard that announcement it was 6pm, and that would be enough to make the most trusting soul smell a rat!

The other part of the lady's not fitting in with the world was having to walk. If she had had a car the wasted journey would not have been serious. Perhaps the assumption that everyone is motorised led to the man's not worrying too much about accuracy in his announcement.

MICHIE'S PRIVATEVIEW

Heuristic and deep models of human skill

Professor Donald Michie is head of the Machine Intelligence Research Unit at Edinburgh University.

THE structure of a human expert's skill can be subdivided into two major components. In machine intelligence terms we speak of a heuristic model and a deep model. Great conveniences attend treating these two models as separate.

The dichotomy reflects the fact that (with some variations from one domain to another) a consultant or other person with a highly trained question-answering skill can usually answer the overwhelming majority of clients' questions "off the top of his head", just as a Fischer or a Karpov when playing under the time constraints of lightning chess can usually find a master move in five seconds (less than 200 binary decisions in terms of human compute time).

Expertise

The discovery that a domain specialist's top-of-the-head skill can be mimicked by relatively simple and uniform computational structures, based on pattern-driven situation-action rules, is what has led to the recent rapid development of expert systems such as MYCIN, PROSPECTOR, PUFF, VM, SACON, and others.

It is not generally understood that given an appropriate choice of domain a sufficient level of expertise can often be implemented using just a heuristic model of this kind, with no need for the more difficult and costly task of constructing an adequate deep model. By a "deep" model we mean a representation of the domain's logical and causal structure together with procedures for search, calculations, and reasoning with which recommendations for action may be dug out from the model.

In other domains the ideal system incorporates *both* types of model as separate sub-programs, and links them appropriately. Some well-studied examples (see figure 1) will help to illustrate these points.

The three examples have been deliberately chosen for being tractable by use of heuristic models. They are probably not tractable by implementation of deep models alone. The three examples in figure 2 present a sharp contrast here and the same problem has in each case stimulated successful implementations using *both* kinds of model.

Improved

The simplest way to combine the two kinds of model in a single system is for the deep model to be used as default to answer those questions where top-of-the-head rules fail, ie whenever exit occurs from the heuristic model through failure to find an adequate pattern match. Retrospective analysis of the first case tabulated (pole-balancing) showed that such combination would have greatly improved the economics of each, but in different ways. The run-time skill of BOXES could have benefited by access to a deep model, and the run-time costs of Eastwood's program by access to a heuristic model.

As is inevitably the case in general, implementation costs of the deep model were large compared with those of the heuristic model.

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Donald Michie

SKILL	HEURISTIC MODEL	DEEP MODEL
Bicycling	What every bicyclist "knows" (he doesn't really, but relies on subliminal triggering of learned stimulus-response bonds)	Newtonian dynamics plus control theory
Answering questions in arithmetic	What every calculating prodigy knows implicitly in the form of MYCIN-like situation-action rules)	Axiomatisations like Peano's plus inference procedures. Throw in a specification of the relations underlying fixed-point and floating point arithmetic operations if you like.
Meningitis diagnosis and prescribing	What every specialist knows (well modelled by MYCIN)	Anatomical, physiological, fluid-dynamical, and pharmacological model of the brain; plus biophysics, chemistry [molecular, organic, inorganic] of pathogens and drugs; plus logical model of everyday life for interpreting patient histories.

Figure 1

SKILL	HEURISTIC MODEL	DEEP MODEL
Pole-balancing under constraints	Chambers & Michie's BOXES, 1968. 225 pattern-directed rules.	Eastwood, 1968. Newtonian dynamics plus control theory.
Control of large electrical power systems [Pai et al, Case Western Res. U]	Associative store of pattern-driven rules.	Highly developed logical and numerical model of electrical power system.
Fault-diagnosis in electro-mechanical systems [U Illin.]	Rouse and Hunt's mapping from symptomatic patterns to decisions.	Rouse & Hunt's representations of the logical and causal structure of electro-mechanical systems.

Figure 2

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FOCUS

Making friends with Ada

EVERY two years, or so it seems, a major programming language is discovered, and "Ada" is the current pin-up.

This particular model is little different from previous breakthroughs. Once again the discovery has been heralded as a language which will profoundly affect the computer industry as a whole. Praise has been lavished on Ada by the EEC, the US Department of Defence and the UK National Physical Laboratory.

So far enthusiasm appears to be in muted mode from the DP installations and manufacturers.

While the Ada package might well assist the role of the US nuclear submarine fleet, its relevance in domestic applications has yet to be proved.

Computer Weekly suggested earlier this month that one objective of Ada was to hide surplus details from the user. Security is all very well, but deliberate suppression of the facts as opposed to the more conventional method of carelessness or misguidance would appear to infringe industry codes of conduct. Maybe the ever-vigilant British Computer Society should investigate.

First

It has been hinted that Ada was a friendly countess with close connections with the pioneer of computing, Babbage. Ada herself is generally acknowledged to have been the world's first programmer. If so, then our understanding of acronyms is due for a revise. DIANE, for example has a major role in European telephone networks. Whether the name involves Direct Information Access Networks For Europe or The Goddess of Hunting, is unclear.

Until recently, the DP industry managed to get by with numeric configurations. If you could list your 3380 from your 8380, your Model 23 from System 32, then you could move on five places. Two turns later the player has to identify such alpha cryptics as ASCII and CCITT, RAM and ROM or CMG and CMS. Now, however, identification is much easier. The first-time user can choose between an Apple, Pet or Acorn. Not that microcomputer users will be overworried about Ada, which is a major language tool of interest only to major real time users.

Ada is not just an advanced programming language. It also relates to automation and robots which is probably the reason for its original name, Ironman. The development and promotion of Ada is such that a complete solution to all software problems is being claimed. No doubt such seats of academic learning as Loughborough and Beaumont are already revising next year's course syllabus.

Classic

That there is a need for a standard advanced level language project with an emphasis on standards seems proved. Cobol is frequently criticised as monolithic, but with several hundred versions currently in operation, such a term seems inappropriate. Fortran meanwhile remains the classic scientific language while Algol is in a decline mode. At the same time, basic APL and Pascal are flourishing.

Among other programming languages which seem to have been left on the coding shelf are Snobol, probably a basic language for our climates, and Lisp – a case of failure to pronounce aloud its communication merits.

In the meantime the NCC, the well respected instigator of many level standards, has recently announced some "user friendly" software packages. Perhaps the NCC should undertake a friendly evaluation of Ada.

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Disc drive orders 'go through the roof'

ORDERS for the Memorex 635 Mbyte disc drive have "gone through the roof" over the last three months, according to the company's UK managing director Mike Kitching.

He estimates an increase of 200 to 300 per cent since August, which he attributes to previous customer uncertainty being cleared by the June announcement of the IBM 3380 with 1260 Mbyte capacity.

IBM says that 3380 orders are scheduled fully to the end of 1982. Kitching adds: "A customer now has his delivery date – say in 24 months – and has gone out to buy capacity for the meantime.

"The result is that orders have gone through the roof since late August/early September." He estimates a backlog for the 635 Mbyte model 3652 now standing at almost $5 million.

The other major PCM disc drive manufacturer, Storage Technology, also reports buoyant sales. "We are way over budget," comments UK marketing manager Colin Cook, who has already passed his 1980 target for similar capacity units.

Market share

Kitching says that demand for UK storage capacity is growing at about 35% a year, and that it will be 1983 before IBM can deliver enough 3380s to threaten Memorex's market share.

He claims to have equipment installed in about 320 of the 530 IBM mainframe sites in the UK, and to have 80% of the PCM market.

Cook says Storage Technology has 10 installations with 130 spindles in the 635 Mbyte size.

Both PCM manufacturers have announced their 3380 equivalents, the second quarter of 1982 being the earliest date set for first customer shipments. IBM will start deliveries in September 1981.

To match the reduced cost per Mbyte of storage offered by the 3380, Kitching has introduced stepped leasing for his 3652. Customers will continue to pay current Memorex prices until they take delivery of their 3380 and will have their subsequent charge per Mbyte reduced to 3380 levels for the lifetime of their lease.

Storage Technology reports there has been a move to rental agreements, rather than purchase or lease, since the 3380 announcement.

KITCHING . . . UK storage capacity demand is growing.

Mobile data terminal launch

PLESSEY has launched a data terminal designed for mobile use with existing radio equipment. Based on the Zilog Z80 microprocessor, it measure 11 x 10 x 8 inches, contains a 315-character CRT display, keyboard, 27K bytes of store and a V24 interface driving a local printer.

Called the UMCT, universal mobile communication terminal, the device transmits and receives at 4,800 bps in bursts of up to 0.6 seconds for a screenful.

Development started in Canada two years ago, Plessey joining in last year. Trial systems have been running in the US, Canada and Sweden with interest expressed in the UK, Belgium, Spain and Italy.

The unit is aimed at police, emergency services and vehicle fleets needing automatic access to databases and can operate with up to 300 terminals on one radio channel.

Data flow agreements vital to protect Third World — ILO report

INTERNATIONAL agreements on technology transfer and cross-border data flow are sorely needed if the Third World is not to suffer drastically from impending changes in technology, especially those brought about by computers.

That is the main message of a report on the impact of microelectronics just published by the International Labour Organisation, a body representing unions, governments and employers.

The author, Juan Rada of the Centre for Education in International Management in Geneva, is worried that the embodiment of more technology in products such as machines with firmware included will restrict the scope of developing countries for adding value of their own to components, thereby promoting their own industries.

Balanced

Improved telecommunications will also enable developed countries to provide data processing and database services to the Third World, he feels, so there will be no reason for local services to be set up.

International understanding on these issues is vital, Rada says, so that developing countries can be provided with technologies for their own use and to ensure a "balanced flow" of data. There is plenty of potential benefit for developing countries in new technology Rada feels; these include the saving of capital and skills, and better control and allocation of resources.

The understandings could only be guidelines, not binding rules, Rada asserts, as for instance it is impossible to control the actual flow of data. The most that could be done, he says, is that "everybody would be asked to be good boys."

There has been some misunderstanding of the views expressed in the report on the likely impact of microelectronics on employment. Rada has specifically not made any overall quantitative forecasts because he says it is impossible to do so. It is possible, though, to look at specific sectors and to predict on past experience that there will be displacement of labour. Effects are "likely to be serious," Rada feels, but he can the possibility of absorbing the displaced labour in services, not in industry, if enough effort is spent on retraining.

Local conflicts

He disputes the predictions some have made of social turmoil and unrest on a large scale, produced by technical change. He thinks strife will be confined to local conflicts, like the 11-month closure of The Times.

The report, commissioned last year, is the first of several studies the ILO is sponsoring in this area of the impact of technology. Rada will be carrying on more work on the North/South question. The erosion of the developing countries' labour cost advantage by automation could lead to increased dependency on such countries as the US, he thinks, particularly as more production depends on information flows.

French learn by computer

The French government is laying great emphasis on education for the information society with 3,000 of a scheduled 10,000 micros already installed in French schools, the remainder following by the end of next year.

Speaking at the London branch of the BCS last week, Phillipe Dreiux, deputy chairman of Cap Gamini Sogeti and high priest of French computing for the past 25 years, explained that France was pursuing a more aggressive policy of public awareness than the UK.

Over 34% of the general public had been involved, directly or indirectly, in the Informatique Week sponsored by French President Valery Giscard D'Estaing last year.

France had enacted a privacy law backed by an independent and aggressive commission which had thrown out a plan to produce computerised and unforgeable replacements for the identity card every Frenchman must carry.

Transdata launches multi-language range

A RANGE of microcomputers, suitable for multi-language operation in commercial and scientific applications has been launched by Transdata.

The multi-language operation is made possible by using the CP/M Digital Research operating system and should assist the many companies which need to share their hardware among a variety of user departments.

Fortran, Cobol, Basic and APL can all be run and a multi-user package, MP/M, permits different language programs to be run simultaneously.

There are three basic models in the Cx500 range, all employing multiprocessor architecture with a Z80A master processor.

Bottom of the range is the £3,500 Cx502 with 64Kbytes of RAM, and dual 8in floppy disc drives. At the top end is the £8,000 Cx504 with 20Mbytes of Winchester disc storage and cartridge tape security back-up.

The company hopes to derive about 40% of its revenue from microcomputer products, with expected turnover growing from about £2m in June 1980 to £3m next June.

Transdata's new national sales manager, Rob Hollands, who joined the company from Perkin Elmer earlier this year, is leading a vigorous sales and market drive.

HOLLANDS . . . dynamic approach to micro campaign.

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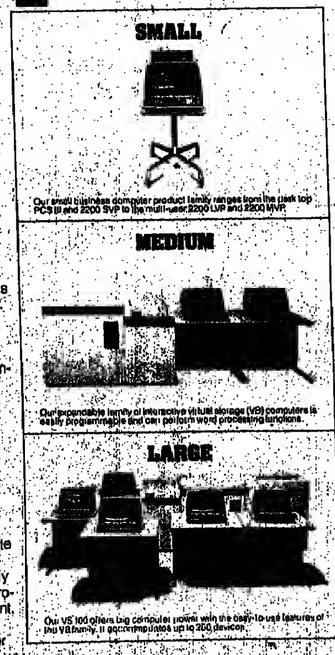

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Micro sales staff 'have little training'

SHARP criticism of micro retailers and salesmen came from Chris Ryan, head of computer systems at international cinema finance and information group Mills and Allen, at a London launch meeting of the Institute of Data Processing Management last week.

Ryan, whose company makes extensive use of micros, commented that the mainframe, mini and micro sales forces represented a computer industry problem because the majority of these sales people had little training in general business practice.

RYAN . . . "the majority had little business training."

Dealing specifically with the micro business, Ryan identified two types of salesman: the small retailer with a range of machines to sell and the sales systems consultant.

In the case of micro retailers, Ryan described the person and the problem as that of "having several micros on display, all demonstrated but by someone who hasn't got the time to listen to your problems."

Ryan was more complimentary about systems consultants but pointed out that micro systems consultants in general, like the retailers, lacked technical backup.

Looking to the future, Ryan hoped that the industry would "develop purpose-built parameter driven type-of-business-software solutions for each aspect of a particular trade or industry".

To reinforce his points, Ryan introduced on stage Henry Barnett, a licensed bookmaker and entrepreneur.

Barnett has been using a micro for several years for two unusual tasks. He uses a Pet, bought as a toy, to evaluate prospective new betting shops and to estimate when he should begin to lay off bets.

Japanese set ambitious fifth generation targets

THE Japanese Ministry of Trade and Industry, MITI, wants its counterparts in the UK, West Germany, France and the US to co-operate on research into the capabilities that will be required of computers in the 1990s.

MITI's keen interest in an international effort is not surprising because the Japanese government is prepared to contribute only a relatively trivial 15 million yen, about £30,000, next year to the studies being carried out by the Fifth Generation Computer Survey and Research Committee. This is the body set up by MITI last year (CW, June 7, 1979) to carry out research groundwork.

KEITH JONES discusses a report on the findings to date of the Fifth Generation Committee, published this year by the Japan Information Processing Development Centre, which is working with MITI on the project. Jipdec is a non-profit-making organisation set up in 1967 by the Japanese government with the support of the computer industry to promote information processing research.

IN an interim report on study and research into fifth generation computers, the Japan Information Processing Development Centre, Jipdec, outlines features for fifth generation machines which are so ambitious that even the 1990s might not see their emergence.

Some features will be further developments of trends that are already under way, such as an increased use of non-von Neumann architecture and a greater degree of processor specialisation.

But far more exciting and revolutionary will be a concept that Jipdec has chosen to call Knowledge Information Processing, KIP for short.

According to Jipdec, KIP will have two basic functional elements: high-level man-machine interfacing and the ability to solve problems rather than simply process data.

Reasoning

The interfacing capability will enable all forms of information to be input conversationally, including natural language, patterns, images, hand-written characters and speech.

Problem solving looks like involving even more complex functions. Jipdec points out that the fifth generation system will require knowledge of the field covered by the problem and will therefore need to be able to merge fresh knowledge with existing knowledge without contradiction or conflict. Another essential capability will be inductive reasoning, the ability to discover order in a collection of data.

A computer for handling these functions would need to be a good deal more than just a number processing machine. Jipdec sees the need for a powerful symbol manipulation computer capable of pattern matching at high speed, separating garbage from meaningful information and, at the highest level, carrying out something akin to reasoning with the use of parallel processing of some form.

Non-silicon

Working with the "reasoning" machine would be a dedicated database computer probably employing a relational structure and performing what Jipdec describes as "relational algebraic calculations".

The report recognises the significance of high performance, non-silicon semiconductor technologies for implementing machines that could conceivably be powerful enough to realise these functions.

Circuitry employing Josephson Junction or chemical compound semiconductors, Gallium Arsenide being the best known, are the two most likely choices.

According to the report, the main motivation for the computer industry to tackle much more ambitious applications for computers outside the conventional field of commercial data processing will be an increase in computer price performance so large – up to 100 times – that it will not be matched by a comparable expansion in the commercial sector.

The computer industry will therefore have to turn its attention to pioneering new application areas, and the report lists a few fundamental needs of which society is considered to be "vaguely aware". One area is easy and immediate access to information, a capability that will require technology that can translate the imprecise information requirements of people into clear requests.

A second fundamental need, according to the report, is for computers' capability to stimulate scientific experiments to be extended to the social sciences. A third requirement is for the development of computer-driven robots which will take over a lot more jobs performed now by humans. The report recognises the increasing importance of computer-aided design and manufacture.

The committee set up by Jipdec to carry out the study into fifth generation machines is made up of three sub-committees. One has been assigned the task of writing a social scenario for the 1990s.

A second sub-committee is looking at the basic hardware and software problems that need to be overcome in order that fifth generation machines may become a reality, while the third is studying the device technology that might be available in the 1990s.

Ten firms enter PoS market

THE past year has seen another ten companies enter the point-of-sale market and the equipment itself has become more flexible and sophisticated, says a report from the Retail Management Development Programme.

"Major technology advances" and lower market entry costs are given as main reasons for the flurry of activity.

The guide points out that dividing lines between electronic cash registers and point-of-sale equipment are becoming indistinct and says categorising the devices is not straightforward.

Sophisticated electronic cash registers have enhanced features like large solid state or diskette memory, price look-up and a slip printer, the report adds.

Portable data entry terminals are used widely to support stock reorder systems, based on stock holding and requirement as opposed to the point-of-sale data collection.

The report says that these devices may be used as low-cost substitutes for the point-of-sale terminal, but PDRTs have no data transmission facility so their use has not really taken off.

Companies new to the UK point-of-sale market are Cybertech, MKD, Nixdorf, Norfond, Prodata/Compucorp, Quality Systems International, Software Sciences, Xanthus, Zonal and Retail Control Systems with Chubb Systems dropping out.

IBM expands range

IBM HAS stepped up its already considerable interest in the growing UK point-of-sale market by adding five terminals to the IBM 3683 range and introducing a new check-out scanner. Known as the models 1A, 2, 2A, 3 and 3A the 3683 additions are user programmable.

Suitable for use with models 2A and 3A the IBM 3687 scanner, was developed at the company's Raleigh, North Carolina laboratory; to read both European Article Number and Universal Product Code symbols.

The IBM 3683 terminals come with 32 blank function keys for user definition, and user written programs determine the type of information displayed to the cashier.

They have 56K of basic storage which may be upgraded to 120K and support a range of optional features, including coin-IBM scales and coin dispensers.

Software security is provided by a number of means – for example, the user could specify mandatory cashier identification, security codes for certain data, and quantity and price limits. Hardware security comes from journal and cashier drawer locks.

Manufacture of the 3683 for Europe, the Middle East and Africa will take place at the IBM plant in Pomezia, Italy. The 3687 will be produced at the IBM Raleigh plant.

38 delivers

The productivity advances of IBM's new System/38 are being confirmed in early installations.

IBM has started delivering System/38s to customers.

And customers have started delivering comments like these to IBM:

"RPG III and the interactive data base utilities are helping us to implement new systems quicker than we ever thought possible."

Mike Finch, Hospital Saving Association, London.

"I created a special equipment report in 15 minutes flat. Before, it would have taken a day and a half of programming."

Chuck Peiser, Data Processing Manager, Road Machinery and Supplies Company, Minneapolis.

"We've developed an online order entry system with one-third the effort and the application is much more polished. We're very pleased."

Larry Brenner, Director, Corporate Information Services, United Merchants and Manufacturers, New York City.

"The System/38 significantly reduced the amount of code necessary to write a program and the time and effort required to move into new applications. We're extremely enthusiastic."

Larry Peterson, Director of Data Processing, St. Olaf College, Northfield, Minnesota.

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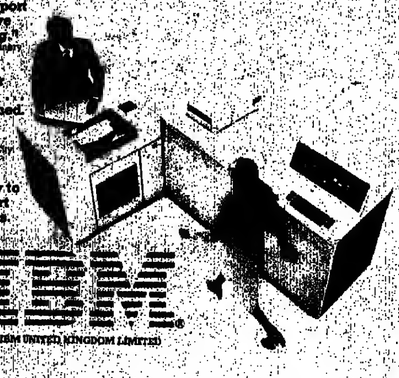


IBM UNITED KINGDOM LIMITED

PROGRAMMERS' PAGE

by Pamela Rowe

Heuristics helps to cope with partner problems

LAST week Programmers' Page started a series on problem solving by looking at the brainteaser and describing the total search tree to solution, in 11 moves. This week we progress to heuristics and problems too complex for representation by a tree of all possible moves.

The sort-into-sequence is a familiar Christmas stocking filler – it is also an example of a combinatorial explosion (see Fig 1).

Its explosive qualities come from the number of possible moves at each stage. For any particular move there are always two three or four pieces surrounding the space, one of which is moved into it on the next move.

Thus from an initial state an average of three moves may be made. From each of these a further three are possible and so on. The tree explodes with exponential combinations. At four moves ahead it may contain 100 nodes, at six ahead this will be nearer 1,000 and approaches a million at 12 moves.

Estimation

Board games like chess and draughts are problems of the same ilk. The complete solution tree for draughts contains 10^{40} nodes, which under optimum conditions would take 10^{21} centuries to examine – or a thousand million billion centuries.

Exhaustive searches are out for these problems. We need to be more selective, examining only those nodes most likely to succeed. How to recognise them? Obviously some sort of evaluation is needed; one way is to award each move a numerical score.

In the sequence puzzle this could be the distance of each square from its final goal. The total score for all pieces gives an estimate of the number of moves needed to achieve solution, so a lower score is better than a higher and zero means you're there.

At each move the lowest score is chosen as the line to follow, although this is not always fruitful and can lead to loops and the like, in which case the next least score is taken.

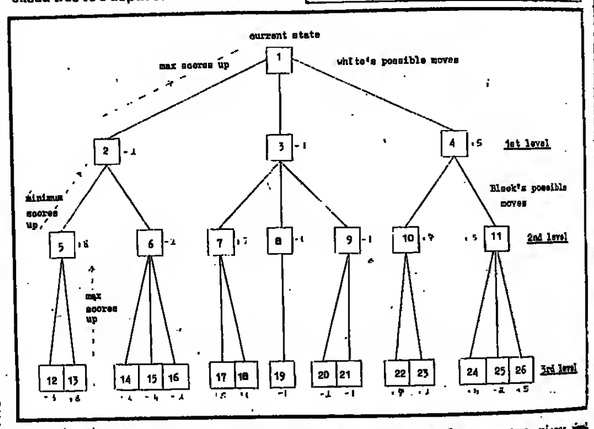
This technique of educated but fallible guesswork is known as heuristics. A heuristic for last week's problem of the programmers versus redundancy might decide to evaluate by the number of people reaching the 8th floor.

This would be unproductive because, as was shown last week, at one point to get everyone upstairs it was necessary to send two down again. The evaluation would veto the move and thereby miss the solution.

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	

Figure 1 (right): The finel stete of the sort-into-sequence puzzle.

Figure 2 (below): The mini-mexed look ehead tree to e depth of three moves.



Compromises

Getting back to the chessboard, is a heuristic feasible? If so, isn't it just what an experienced player does anyway, evaluating several moves in advance?

The big difference with board games lies in having an opponent. That's no revelation, but it does mean that the heuristic must be modified to cope with the two opposing aims.

Mini-maxing achieves this, recognising that an opponent can upset the applecart of a nicely planned heuristic, so compromises by only looking a few moves ahead. Scores for intermediate states are then worked back and a sequence of moves pinpointed.

Mini-maxing a chess game would go something like this: White plays Black, who has just moved. Both players are trying for the highest score from their point of view. Looking at it from White's viewpoint, he plays for a large positive score, but a large negative benefits Black. Zero indicates advantage to neither.

White starts off with a possible three moves – capturing the black bishop (8 points); threatening the black pawn (+1); and endangering his own pawn (–3).

Evaluation

Black may respond to the loss of his bishop by taking the white castle (overall score of –2) or by missing his chance (score remains at 8) nodes 5 and 6 respectively of 2.

Similarly he has options for White's other moves. By this process, a tree of all possible moves is built up with scores at each stage. White deciding to mini-max to a depth of three moves (see fig 2).

The scores at the final, terminal states are directly evaluated. Those encountered on the way are effective scores, taking both playdis' moves into account.

Now comes the mini-ing and maxing. The effective scores are worked out by passing back the terminal score, depending on whether B or W made the move.

If White's move leads to the terminal 3rd state the maximum scores are passed back to the 2nd level as those are to White's advantage.

At the previous level – 1st to 2nd – Black's move leads to the 2nd level state so the minimums are passed back to the 1st level. White chooses the move from initial to 1st level state, with the highest possible score, in this case to node 4, score = +5.

Good function

Note that without mini-maxing, to temper the score of +8 for node 5; to –2 for node 2 (Black's retaliation to his lost bishop by seizure of Castle White), White would probably have opted for this route to node 5 via node 2.

This backwards evaluation is quite straightforward; however, much depends on finding a good function to set the terminal values. For board games this can be tricky and comes down eventually to choosing a few crucial features of the game and testing for them.

In a draughts game these might be promotion of a piece to a King, or the relative strengths of Black and White. Each chosen feature is scored numerically and the total gives the state of the game.

To achieve even finer control, different features can be weighted to that one overrides the other. The two previous examples could be scored: Black's piece promoted to King, –5; numerical supremacy by White, +5, equals zero. The program deems B's King twice as important as the numbers so weights the scores accordingly to result in –10 + 5 = –5.

It can also learn to do better, from its mistakes, by adjusting weighting as the game unfolds and redressing imbalances. In a perfect world, the inherited back score from mini-maxing would be the same as direct evaluation. Usually though they vary slightly, and the best guessimate needs to be known.

Adjustment

The whole tree of moves to solution is 10^{40}, which would be extremely accurate, but just as unfeasible. The mini-max tree is a realistic compromise involving just a few moves ahead, so is generally a better answer than direct evaluation.

A researcher called Samuel in 1963 devised a program to bring the two scores into line, by adjusting weights. If the direct evaluation was the smaller, all the weights would be enhanced for the positive features.

For instance, a mini-maxed score might be 6½ while the direct was a total of (score of 3 x weight of 2) combined with (score of –2 x weight of 1) = 6 + –2 = 4. The adjusted direct score to match the mini-max is (score of 3 x wt of 2½) + (score of –2 x wt of ½) = 7½–1=6½.

Vice versa for direct scores that are greater. Each new state must go through this process which Samuel called hill-climbing, to describe the slow steady weighting improvement and program performance. Samuel's eventually beat him at draughts.

Having chosen the most important features, improved the weightings, and looked as far ahead as feasible – what now? That's the problem, because short of extending the tree search not much more can be done. Already chess programs take the maximum two to three minutes allowed per move under the master tournament rules.

Sacrificed

An obvious and probably already vocalised-by-you flaw in the limited look-ahead tree is the Big Treat just beyond the search cut-off. As it's out of bounds the program ignores it, making decisions happily, until WHAM – the factor hits home and you may have lost your queen. This was labelled the "Horizon Effect" by Berliner in 1977.

Even worse, the loss of the queen may have been inevitable but with limited look-ahead the indicated best move was sacrifice of, say, a rook. Knowledge of the queen's impending doom could have changed the situation, the best move, and at least saved loss of battleplace.

What is lacking is an overall strategy and the simple concept of numerical score is not enough to achieve it. Newer programs have strategy built in as pre-stored patterns to illustrate situations such as a threat to two pieces simultaneously, or a strong defence position.

When one crops up, the program responds with the question: Can one piece protect both those threatened? According to the answers received, the program searches out other appropriate patterns, selects a move and checks that it is legal.

The difficult bit, naturally, is in defining the patterns and formulating the reasoning in enough detail to write the program.

Possibilities

Humans seem to practise the same sort of pattern strategy. Contrary to popular belief, chess masters do not have phenomenal memories but, since they understand the game so well, can remember situations or groups of pieces. This demands much less from memory.

Neither do they appear to plan many moves ahead, any system search. It is much more a question of recognising and opting for a fairly favourable move without knowing or worrying if it is the best possible.

This leads to errors but blunders are expected and accepted in human game-playing. The technique is a short cut, minimising the otherwise impossible burden of search for the limited human memory.

Bank TUs report

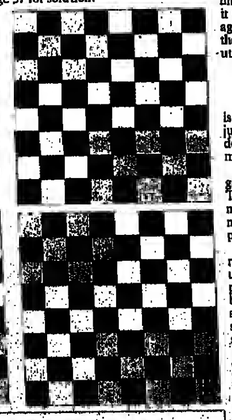
BANKING trade unions all over the world are urged to pull together on the use of new technology in a report from the International Federation of Commercial, Clerical, Professional and Technical Employees (FIET).

In Bank Workers and New Technology, the Federation demands that employers consult and negotiate with employees on the introduction of new technology and warns that such things as cash dispensers, automatic tellers, further developments in telecommunications and the eventual use of point-of-sale terminals will radically alter the banking industry.

Puzzler

AS middle-age makes its inevitable inroads, I note with distress that 70% of my close friends and contemporaries wear spectacles, and 75% are definitely overweight. Furthermore, my circulations show that 80% smoke, and 85% drink.

What percentage at least must be afflicted with all four disabilities/weaknesses/bad habits? There is a rule-of-thumb which will give the answer in just a few seconds. See page 37 for solution.



● Harking back to the October 16 column, several readers have discovered that the grouping of the eight-piece solution may be varied slightly without breaking up the basic pattern. These diagrams from S J. Collins make the situation clear.

Dissection A is the original answer, and B shows how two of the "quarters" can be switched over. Dissection C results from juggling one corner of B.

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MICRO NEWS

by Eileen Stainer

Commodore into cash registers

ORIGINATOR of the Pet microcomputer, Commodore International, is about to venture into manufacturing electronic cash registers. The announcement came at the company's recent celebration of three years' success in the UK personal computer market.

A new division is to be formed to market the first cash register, planned for release next year, but developments do not end there.

After reorientating towards the business marketplace, Commodore foresees an explosive lower end of the market among systems like the Sinclair ZX80 and Newbury Laboratories' Newbrain.

To compete in this area the company has developed an expandable colour computer system called VIC 20, which should be available in the UK around Easter next year for under £200. Its size will be similar to the Pet keyboard section without the monitor.

Initial launch

The name VIC 20 stands for video interface computer with a 20-column screen. A 40-column version, the VIC 40, should be available by the end of next year according to Kit Spencer, general manager of Commodore UK in Slough.

Based on the 6502 8-bit microprocessor from MOS Technology, a Commodore subsidiary, the VIC 20 also uses another of its chips called the VIC (video interface chip) which incorporates RAM, ROM and video control circuitry.

Designed and manufactured at Commodore Japan, the VIC 20 is to be launched there first, followed by the US and then the UK.

The reason is to fight Japanese competition on its home base. According to Kit Spencer, Commodore Japan is run completely by Japanese management, so the VIC 20 must be a Japanese product.

With 5K of RAM expandable to 32K, the system will be aimed at the educational and personal market. It will connect to an ordinary colour television set or monitor and run cassette and plug-in ROM modules.

Peripherals under development for use with the single RS232 port, expansion and gain ports, include a tape cassette unit, a single floppy disc drive, a printer and other sddon accessories.

The system with programmable function keys will run Pet Basic, probably 12K of ROM, and Pet software will be adapted to run on it. In addition, special applications packages and games will be available in plug-in ROM form.

Plug-in form

Commodore plans to distribute the VIC 20 to the current 200 dealers in the UK and possibly by another outlet.

A recent IDC survey has rated Pet the number one microcomputer in Europe, and Commodore reckons on having 50-70% of the market.

This percentage can be broken down into areas like business applications which, says Commodore, accounts for 60 to 70% of the total. Education takes 15 to 20%, control applications 10% and the hobbyist marketplace accounts for about 5%.

Kit Spencer says that the company philosophy is to "plan to make products redundant before the competition does".

Using this philosophy, Commodore is planning an enhancement to the 8032 SuperPet, released in April at the Hanover Fair (CW, June 26). A 96K version should be available in the UK and US at Easter next year.

Under way

Effort is also going into the communications market which is considered by Commodore to be one of the most important areas and around 30 dealers are being trained especially for this field.

The company has been demonstrating a Pet talking to a DEC intelligent terminal at the Which Computer? Show held this week at the NEC in Birmingham.

More plans for next year include the setting up of an integrated circuit plant in Europe. Production at the German microcomputer products plant is now under way at Brunswick and marks the start of plans to localise marketing and manufacturing operations throughout the world.

Early next year will see the appearance of eight-inch floppy discs offering 1½ or 3 Mbytes of storage. At the end of the year a hard disc should become available.

Apple in the lead

FOR the second year Tandy, Apple and Commodore are in the top 100 data processing companies in the US, according to an annual ranking published by Datamation magazine in New York.

Tandy leads the three at position 38 with $150 million worth of data processing related revenue in 1979.

Apple is in position 61 with $75 million of revenue in the data processing field, and Commodore comes 76th with $65 million worth of data processing-related revenue.

Apple comes top of all the 100 companies with its 650% growth rate.

Japanese introduce the ABC

DESIGNED and manufactured by Al Electronics of Japan, the ABC-24 microcomputer marks another Japanese entry to the European marketplace. The ABC-24 is Z80-based with 64K of RAM, and two RS-232-C serial ports.

Its 80-column 12-inch screen is detachable from the 101 key standard qwerty keyboard and numeric pad, and dual floppy discs provide up to 640K of extra storage.

With CP/M, MP/M, DOSKET and UCSD Pascal, the complete system is available in the UK for £3,000 from London-based Regan International, an associate company of CapScan, the OCR and data preparation bureau. The system will also run Basic, Cobol-80, PL/3 and Fortran IV. With additional daisy wheel printer and 'Wordstar' word processing package the system is available for under £5,000.

Safety going by default

FEW personal computers in current use in the UK meet the British Standards Institute criteria for safety requirements, especially with regard to power supplies. One that does is the Sinclair ZX80.

These were among the conclusions drawn up at a one-day seminar on testing methods for personal computer systems, held at the Polytechnic of North London's Electronics Department last week.

Objective

The day was organised by the polytechnic, the North London Hobby Computer Club and the Association of London Computer Clubs, and chaired by Robin Bradbeer.

Main objective of the day was to obtain co-ordination between hardware and software evaluation of small computer systems. Users and reviewers contributed ideas which it is hoped will be compiled into an unofficial format of reviewing next year.

An important point made by reviewers was that the lack of testing areas and facilities made the job difficult and almost impossible to carry out uniformly standardised tests.

Software on personals is becoming more difficult to assess because of higher level languages like Pascal coming into more common use.

It was pointed out that evaluators were often reduced to using "off-beat" tests like placing the system in a typically noisy environment (like the kitchen) to assess interference effects.

Transformer

Several systems reviewed were found to have no fan protection or transformer protection. In one case, a small object (eg, a child's finger) could easily find its way into the back of the system and get caught up with the mains transformer.

Robert Webb, ex-marketing director for Currys Microsystems, who was scheduled to discuss the retailer's role in evaluation and testing, failed to turn up.

Ohio sets up UK operation

US COMPANY Ohio Scientific has set up a UK marketing and sales base in Langley, Bucks, which will incorporate full administration, testing and burn-in facilities to support a planned 30-dealer network.

The previous nine-strong dealer network has been expanded to 14 and Ohio hopes to have recruited a total of 30 by the start of next year. On-site servicing and maintenance is to be carried out by Systems Reliability on a contract or time-by-the-hour basis.

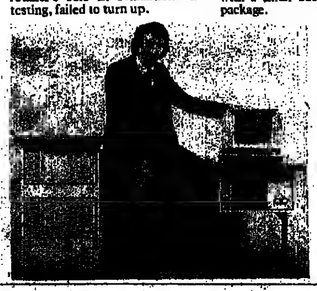
Ohio will concentrate primarily on two ranges, the C2-D and the C2-OEM. The latter is aimed at the business market and is 6502-based with 48K of RAM costing around £1,900. It comes in a table cabinet with a monitor and printer and features an RS-232 port and two eight-inch floppy disc drives.

Versatility

The more advanced C2-D is available for around £5,000 and incorporates an eight-inch Winchester disc. It comes with 52K of RAM, a serial I/O port, and a single eight-inch floppy disc drive.

Running Ohio Scientific's own small business-oriented operating system, OS-65U, the C2-D can use UCSD Pascal, Fortran, a resident Assembler/Editor and 9-digit precision Basic.

Optional software available includes a word processor package (WP-2), a database manager and information management system with a small business accounting package.



Alan Davies, managing director of Ohio Scientific, with the C2D and C2-OEM systems.

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OP SPOT

by Paul Fisher

There are still success stories in British industry, despite the gloomy prognostications of the CBI and other organisations. Two small British companies, based in Surrey and Staffordshire, respectively, show how to make a significant impact on the highly competitive domestic field of product and service back-up.

Role of ops manager in two success stories

A SURE way of judging the true importance of an ops manager is to assess the extent of his control over budgets and there is a problem of definition here. Depending on the size of the installation, ops managers are anything from the managing director's golfing partner to a machine minder minding other machine minders.

David Hall is UK sales manager for Norman Magnetics and his job is to sell and service magnetic media. Ray Tungate has his own company and is in the business of designing and selling computer forms and labels.

For both men the ops manager is a figure of vital importance because it is to him that they go for a buying decision. Both reckon that at least 60% of the ops managers they approach have enough control over their budgets to decide on whether to buy from them or not.

Expanding

Says David Ball: "Although it is the job of the DPM to make major hardware decisions the ops manager usually has the power to make media purchases. In fact, I know of sites where this kind of decision is the responsibility of the senior operator."

Norman Magnetics was formed in 1973 and, from an initial investment of £6,000, has grown into a business which turned over £4.5 million in the last financial year. Based in Farnborough (Hants) it started a US subsidiary in Costa Mesa, California last year.

Some 58% of its business is done abroad, with sales recorded in all major European countries, the Far East, the Eastern bloc and the US. Its overseas success was recognised this year with the Queen's award for export.

However, as the pound gathers strength, the export market is becoming harder to crack. A strong pound might make our package holidays cheaper but it makes the work-a-day world considerably harder for companies like Norman Magnetics.

In this context, it is worth noting that government statistics showed that the British computer industry contributed a net balance of trade deficit of £200 million in 1979. That might be a cause for general gloom, but what is depressing for Norman Magnetics is the following set of figures.

When it started trading overseas £1 purchased 1500 liras, 147 pesetas or 3.8 Deutschmarks. At the time of writing £1 buys 2150 liras, 183 pesetas or 4.6 Deutschmarks. To the Italian or Spanish buyer that means a huge jump in the price of British products; for Norman Magnetics it means slimmed-down profit margins.

So Norman Magnetics has been forced to turn more of its attention to the domestic market. It has already collared a section of the homegrown OEM market and is now paying particular attention to the end user — and the end user is more often than not the operations department.

At present, such sales account for 15% of the turnover and it is David Hall's brief to put himself about and increase this proportion.

"It's only recently that we have started actively pursuing the end user market," he says. Dealing with individual installations causes more administrative aggravation because orders are smaller than those from multinationals.

Ready-coated

Ball's major problem is getting the name of Norman Magnetics known in a market dominated by the high finance names of Control Data, Nashua, BASF and Memorex. To this end he is advertising, doing direct mail shots and building up his network of personal contacts. So, if he comes knocking at your door, you'll know why.

What he will be selling is a range of recording media including disc packs, disc cartridges, mag tapes and *floppy discs*. Many of these are manufactured at Farnborough. The firm buys ready-coated discs, mostly from the US. There is a production area capable of assembling and testing over 1,000 cartridges every day.

Non-servo written packs are tested with equipment developed in-house. For servo written packs there are three $250,000 servo writers. And if you place an order, there is a fair chance of immediate delivery because more than six months' stock is stored in a recently completed warehouse.

In the salesperson's argot, Ball's "unique selling point" is that, as Norman Magnetics is a British concern, it is able to offer swift technical back-up. A back-up and repair service is important, especially with high technology servo written products, and is the backbone of the company's business.

Part of David Hall's sales pitch consists of several businesslike anecdotes along the lines of a user who had a head crash on a systems pack.

Guarantee

The supplier couldn't do anything to help and it was vital to retain the information on the pack. Norman Magnetics came dashing to the rescue by burnishing out the head crash on one of its expensive machines and retrieved 90% of the information on it.

Disc packs get broken, wrecked, dropped and jumped on. Norman Magnetics' repair service rebuilds, rebalances, reservo writes and drive tests damaged discs from any manufacturer and returns them with a 12-month guarantee.

When I asked David Ball about prices all he was prepared to say was that they were "very competitive". I didn't have the time to compile a survey of disc prices nor could I look at the forms market as a whole.

When I asked Ray Tungate about his prices he slipped more elegantly out of committing himself to anything specific by saying: "The forms market is a bespoke market and therefore has bespoke prices."

Ray Tungate runs a smaller and younger business than Norman Magnetics. Instead of 100 employees he has a staff of eight. Tungate has spent his whole career in the forms business, having started as a printer.

He set up on his own 18 months ago based on a series of converted 19th century farm buildings which stand in 14 acres of land near Alton in Staffordshire.

Tungate's selling line goes like this: "Most computer forms are drab and ill-designed. Many operations managers regard forms buying as a chore because there are only marginal differences between salesmen and companies which supply them.

"Computer people fail to appreciate that forms are frequently the main contact of customers with the company, and that impressions of the company are formed by the documents that are seen."

Unafraid of a bad pun, Tungate promises "forms that inform" and launches into *his* unique selling point. Tucked in the Staffordshire pastures, he has a graphic designer so that he can offer a design service which is available without charge and without commitment.

It's a policy which must be working for him, because among his customers are Horizon Holidays, Stanley Tools, *Tarmac* and Bassetts, the liquorice allsort people.

The forms are printed in colour with tints to attract the eye and give emphasis. The idea is to help "speed reading" and to do away with confusion. In Tungate's opinion, the British market has been an easy one for several reasons.

He says: "The rapid growth in data processing has given the forms companies an easy and fast growing market of undemanding buyers." Because of this, salesmen and DP personnel have had no training in graphic design.

Norman Magnetics and Tungate Forms are true blue Brit and you can expect to hear more from them in the next few months. They might even flatter you with a personal call — but they'll probably go easy on the Back Britain tack and stress what they have to offer in terms of a service.

Not many people take the idea of patriotic purchasing very seriously. Whatever a person's political or economic beliefs, they are usually conveniently forgotten when, cash in hand, a thing is trundled with a view to purchasing it.

Patriotism is the motif connecting Norman Magnetics' UK sales manager David Ball (left) and export colleague David Drow — with the Mini Metro taking an appropriate centre stage position.

The new Diablo 630

Probably the most exciting innovation in daisywheel printing since the wheel, itself.

The Diablo 630 from Zygal is a new generation daisywheel printer. The first of its type to use either plastic or metallized print wheels interchangeably.

Zygal make type choice easy with over one hundred different Diablo and Xerox print wheels to choose from.

The Diablo 630 provides the user with a single printer to satisfy both word and data processing requirements, completely.

The advanced design technology built-in to the 630 has resulted in fewer components, more compact size and quieter running than other daisywheel printers.

A full range of compatible paper-handling subsystems are available.

And Zygal can specially customize the Diablo 630 to suit your particular requirements. At a price that will suit your requirements, too.

Complete the coupon. And start the wheel turning.

Zygal Dynamics Ltd., Zygal House, Telford Road, Bicester, Oxon OX6 0XB. Tel: Bicester (08692) 336l. Telex 837907

Please send me: Further details on The Diablo 630 ☐ Details of other products available from Zygal ☐

NAME

ADDRESS

Zygal. Where all the best terminal ideas originate.

Now IBM goes into extra-terrestrial orbit

WHEN God had created the heavens and the earth He took a rest. IBM allows itself no such naps. On Wednesday it launched two mainframes, the smallest of the 3033 series and the new top range 3801. Not content with this, the company was involved with an extra-terrestrial launch three days later.

The first of three telecommunications satellites was sent up by a company in which IBM has a 42% stake. Meanwhile, back at the launching pad, other 303X purchase prices were cut by 20%.

Rear right stands the 3081 processor with the large 3082 processor controller in front, which takes over some operational duties. Completing the assembly are the 3800, 3278, 3278, SCV plus power and coding units.

Faster

There is something predictable about the amazing deeds of the giant multinational. We have all, courtesy of IBM, witnessed bright new technological dawns when another faster, smaller and incalculably better device is announced and a certain weariness is forgivable.

That said, the 3801 really is faster and smaller than the previous top range IBM kit. Compared to the 303X processor it is up to 2.1 times faster, it squeezes 750,000 logic circuits into a box measuring four cubic feet and doubles the capacity.

It consumes half the power and basic central storage capacity is 16 megabytes, which can be doubled. There are up to 24 channels, 16 basic and four optional.

Prices start at just over £2 million which buys the 3801 processor unit, the 3082 processor controller, the 3087 coolant distribution unit and the 3089 power unit.

IBM has achieved this by a new dyadic processor design, in the process restoring a little-used adjective describing a pair of units treated as one.

The dyadic processor within the 3801 is the marriage of two CPUs so that they share the same central storage and operate under a single control program.

For the operator the dyadic processor will bump up throughput and reduce downtime because if one CPU fails its channel set can be accessed by switching to the other.

IBM calls this "deferred maintenance" and says, "Similar possibilities exist for other functional elements of the 3081 processor unit."

In terms of operating, IBM sources say that it will remain similar. The 3081 operated under System 370 compatible MVS/SP. Performance has been enhanced in two ways, the first 10% throughput improvement claimed with Release III of MVS/SP.

This is enhanced by hardware and microcode functions within the linked CPUs. For Virtual Machine users Assist is included as basic.

IBM also claims that the 3081 would not deskill ops. However, the 3082 processor controller promises to do a lot of legwork, if nothing else. It carries out unit initialisation, distributed microcode loads, assists in hardware error recovery and has control over the system console.

For the site where all the mainframe kit is bunched into one room, the 3089 power supply is reported to go about its business quietly and not to bellow too loudly in the op's ear.

For the inquisitive op with a large magnifying glass, the 3081 has sliding doors instead of the usual swing doors showing a thermal conduction module, whose effect is to reduce wiring by allowing tighter chip packing.

IBM seems to have done it again.

SOFTWARE FILE

by Claire Gooding

Insurance market looks promising

THE field of insurance, in which skilled staff expend much time and energy on routine tasks, is beginning to attract attention as a potential software market at both ends of the hardware scales.

Quotel, the GSI bureau whose car and life insurance service is used by many large organisations, (including until recently the AA) is launching a pensions system aimed at the self-employed.

At the bottom end of the same market, but catering for individual insurance brokers, is a system called Muteq which runs on a micro costing under £3,000.

Like all computerised insurance systems, it aims at freeing skilled staff from the mundane jobs of looking up rates and charges so that they can concentrate on tasks demanding personal service. Since Muteq is aimed at small individual installations, it concentrates on simplicity of use for clerical staff, and easy training.

"We don't give just the cheapest quote, we give the entire range with all the different combinations of charges taken into account" said Tim Dobb of DHK Systems, the company that spotted the potential of a micro insurance application.

"The system also explains the reason behind 'no quote' or referral cases, which appear on the screen — which is more than some larger systems do", he added.

Updated

Once the initial cost of hardware — a Z80-based OEM machine called the Periflex 630/48 — is overcome, the software costs £108 on a lease basis, and is updated monthly with all changes in charging rates from the various companies on file.

Although the system draws its estimates from 30 companies at present, there is an overall capacity for 50 and users will be able to have specific companies put on file if not already quoted.

Muteq comes complete with data (which in fact forms a large portion of the entire system), ready to run on an in-house micro.

Although Muteq is implemented under the DMOS operating system for reasons of security, the machine it runs on can also host the CP/M operating systems, which opens up the possibility of a wide range of applications including word processing.

The system is written entirely in assembly language for speed of response and to make room for the vast amount of data necessary for a comprehensive quotation.

Details of over 2,000 cars are stored on file, and the charging criteria and rates of each individual insurance company takes up 4K-bytes.

The final quotation gives a selection across the entire range of companies, giving details on such items as windscreen replacement, which allow the broker to pick out the best value for money.

Quotel's new system gives comparative cost and value-for-money reports on various options open to the self-employed wanting deferred annuity schemes to provide pensions. The system is available to insurance brokers and clients on a bureau basis.

In-house system

THE AA has written an in-house car insurance system to run on its own mainframes, which deals with specific companies, after using Quotel's service as a stopgap.

The AA has taken the optimum path of limiting the companies on file to those it deals with, rather than the whole range as supplied by Quotel. The new system was developed by a four-man team from the AA's own programming section, writing in Cobol for an ICL 2965 and 2904 under *DME*.

Taking four months to develop, the AA says the system is now dealing with 2,500 quotes every week, for less than Quotel cost to run, and without the updating problems that used to occur. Quotel is still used at the AA head office.

OZZ set for happy future

MANUFACTURER of the Pet microcomputer Commodore is about to launch into international marketing of products from the program library for the UK-developed 8000 series. The Commodore Approved Products library consists of packages from various software houses writing for the Pet as well as Commodore's own Management System software.

As well as catering for the English-speaking market in Canada, the US and Australia, programs will be modified to be sold in native-tongue versions for such markets as France and Germany.

Spearheading the market drive are the WP package Wordcraft 80 from Dataview in Colchester and the Commodore Management Systems set of programs, which retail in the UK for £300 to £400 each. One of the series, OZZ, is described as "an invaluable aid in any professional/business environment".

OZZ is a parameter-driven information retrieval system which deals with everyday data such as client, stock, accounting or appointments through a screen format/editing facility. It was developed by Bristol Software Factory.

APL gaining more respectability

A SPATE of products catering for the high-level language APL seems to indicate that this powerful programmer's tool has won a measure of commercial respectability at last.

Most of APL's power — and its drawbacks — reside in its hieroglyphic instruction set, which requires a purpose-built keyboard and printer.

Recent micro-implementations of APL have tried to balance the problem of squeezing a power-hungry language into a small space without trimming efficiency, but the high cost of special peripherals still makes it a comparatively expensive language for microcomputer users.

Two new APL terminals have come on the market, coinciding with the adoption of the language by Zilog for its MCZ-1 microcomputer. Anderson Jacobson is selling a dot-matrix printer with an APL character set for £899. The company claims that its AJ880 is the first APL printer available under £1,000.

Abacus Data Type is offering an APL keyboard which is said to run any APL, having been designed around the definitive IP Sharp timesharing version. It is available for £700, and a printer is soon to be added.

APL was present in strength at Compec a few weeks ago, with versions on view from MicroAPL, and on the MCM micro (used as a pre-processor by BL Systems in its APL work).

Unlike the TIS version from Telecompute which Zilog uses, the MicroAPL Vanguard version runs under the CP/M operating system. MicroAPL is now offering a "teach yourself" course with its products.

There was also a version of the TIS APL in use on the BASF stand at Compec. Although the company has not announced any plans for the language (apart from internal use), BASF's interest is another indication that APL is gaining ground.

Unique in miniature

THE Unique data collection system from the Data General OEM house DCC International has been made available at the lowest end of the DG range on the DG MicroNova.

Priced at under £1,000, the micro version is aimed at small remote installations which would be able to capture and validate data on site and transmit to centralised computing facilities.

According to DCCI, the software is completely transportable from single terminal micro systems through the multi-terminal Nova version up to the Eclipse.

The micro version of the data collection system can also communicate in a non-resident batch environment with other mainframes.

Including automatic data validation, the system uses a library of 70 standard routines.

IBM introduces new ways to improve office productivity.

Sometimes it seems that there just aren't enough seconds in the day to get all your work done.

In an age where technology can move information at electronic speeds, it can still take days to get a finished document into the hands of the people who need it.

But now IBM introduces a wide range of major new office systems and programs.

No matter what your business—no matter what its size—these new offerings can help improve your business productivity.

EFFICIENCY FOR TODAY–MODULARITY FOR GROWTH TOMORROW–THE IBM DISPLAYWRITER.

This may be the easiest word processing system that you've ever used.

The new IBM Displaywriter can show you how to process words. Just follow the instructions on its screen, which guide you, step-by-step in creating, revising and editing documents.

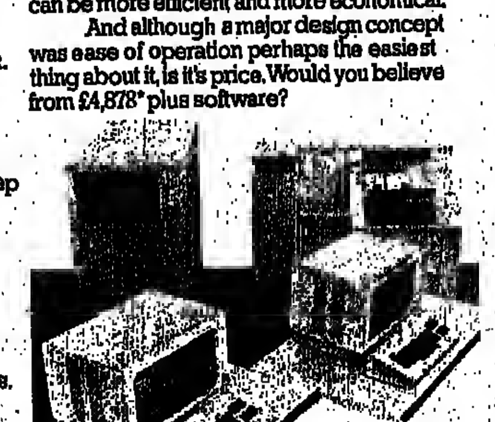
It can even check your spelling at up to a 1,000 words a minute using its electronic dictionary of 50,000 words.

With the communications options, you'll be able to send or receive information from other communicating IBM office products, and suitably programmed computers.

And because the IBM Displaywriter is modular, it's flexible. As your company grows in size your Displaywriter system can also grow in size and capability.

So you only buy as much as you need. You may want to design your system initially for one person, then graduate to two or three—by adding more display screens and keyboards, and later perhaps faster printers. Or start with basic word processing and add more software programs as your needs grow. This is why it can be more efficient and more economical.

And although a major design concept was ease of operation perhaps the easiest thing about it, is it's price. Would you believe from £4,878* plus software?



DESIGNED FOR THE FAST FLOW OF INFORMATION–THE IBM 5520 ADMINISTRATIVE SYSTEM.

The New IBM 5520 combines many office administration activities with electronic document distribution.

Word Processing–from the same visual display unit secretaries can create, edit, revise, sort, process and distribute business information, as well as handle normal correspondence.

File Processing–with the 5520 you can add, subtract, multiply, divide and compare numeric information within files. It can also perform multi-step tasks with just one instruction.

Electronic Document Distribution–documents can be transmitted in minutes–to a single person, to a distribution list, or a combination of names and lists–and the 5520 gives confirmation of delivery.

It's easier than you think. For example, special instructions appear on the screen in plain English when help is requested and you can control many different functions from one work station.

In fact, the 5520 can do several things at the same time. As well as the communications activities, many of the traditional word processing revision and pagination functions can, if desired, be carried out by the system automatically, thus leaving the secretary free to undertake other tasks.

The IBM 5520 is an integrated system supporting multiple work stations, all sharing the same information and facilities. And the 5520 can form part of a network exchanging information and documents with other 5520's, suitably programmed System/370 computers as well as the new Displaywriter.

THE NEW DISTRIBUTED OFFICE SYSTEM–FOR PROFESSIONAL BUSINESS PEOPLE.

The IBM Distributed Office System boosts productivity in text and data handling by bringing the function and power of central computers to the fingertips of your secretarial, administrative, and professional staff.

This new system comprises software *for the IBM 8100 Information* System and a compatible host computer. Like the IBM 37[illegible] Distributed Office

Communications System on which it is based, it provides word processing capabilities, administrative functions, integrates text and data applications, and caters for information retrieval and the distribution of documents over telecommunications networks. It also makes publications production possible at your central computer.

By providing extensive text and data processing functions the system can handle both secretarial and administrative tasks in a manner that allows integration with the business communications needs of professionals and managers.

Key elements of the new system are pre-packaged, pre-tested, and ready to install.

The new Distributed Office System brings powerful computing to company-wide business communications.

MEETING CUSTOMER NEEDS.

At IBM we've always believed that we should offer a variety of solutions to meet the broad spectrum of our customers' needs.

The IBM Displaywriter, the 5520 and the IBM Distributed Office System are our newest products designed for different word processing requirements.

To find out more, post the coupon or ring Valerie Lindsell on Basingstoke (0256) 56144.

To: Valerie Lindsell, IBM United Kingdom Limited, Sales Information, PO Box 32, Alencon Link, Basingstoke RG21 1EJ.

Please send me further information ☐

Please ask a representative to call ☐

I am interested in: *IBM Displaywriter* ☐ *IBM 5520* ☐ *IBM Distributed Office System* ☐

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COMPANY NEWS

ACT on course to hit million target

BUSINESS continues to boom for Birmingham-based services group Applied Computer Techniques, which announced its intention of seeking a full listing on the London Stock Exchange only last week.

The group produced half-yearly results to end-September which showed a 64% turnover increase, from £2,408,000 to £3,954,000, on the same period last year. Profit was up from £308,000 to £407,000, a 32% increase.

In sharp contrast to Scandata's decision to dispose of its bureau operation, ACT has doubled its hardware capacity to meet increased demand.

The directors have made no forward-directed forecast but profits for the full year must be well on target for the £1,000,000 mark.

ACT has two 2950s in current operation, one at Bristol and the other at Halesowen, as opposed to one (Birmingham) at the beginning of the year. Computer supplies and hardware sales were other major contributors to the improved figures.

The only gloomy note in the statement accompanying the results concerned rationalisation in the Microsoftware division. Hit by falling sales, due to both the recession and a change in the software purchases pattern by personal computer users, ACT has reduced the number and range of its packages.

High flier

SCANDATA, launched on the Unlisted Securities Market only two weeks ago at an asking price of 125p, is now trading at 185p. This is a 50% increase in just two weeks and makes Scandata a real high flier in this new market.

Profits up 20%

FOR the first quarter, ended September 26, of its current fiscal year, Florida-based Harris Corp has reported sales and net profit figures up 26% and 20%, respectively, on the same period in the company's last fiscal year. The actual figures this year were \$348 million and \$20.7 million.

Penril expands

DATA communications equipment manufacturer, Penril Corp, has reported a turnover figure for its fiscal year ended July 31 of \$33.3 million, 47% up on the previous 12 months. Net profits saw a 23% increase to \$1,783,405. This expansion resulted partly from an increase in sales of existing products and also from the acquisition in November 1978 of Epicure Products Inc.

Pet boosts profits at Commodore

COMMODORE, which announced spectacular increases of 76% in turnover and 170% in profit for the financial year 1979/1980, has revealed that 66% of this growth came from the Computer Systems Division.

This is the division which markets the Pet micro and the CBM 8000 micro-based small business system. Despite the success of the latter machine, Commodore reveals that the company still considers the CBM 8000 in a launch phase and not likely to reach full profitability until well into 1981.

Coupled with details of the company's results was the news that Commodore intends to meet the challenge of the Sinclair ZX80 head-on with a series of hobbyist-orientated micros called the VIC.

Starting with a 5K machine, the range will include a standard colour feature and retail for between £200 and £700.

The VIC 20, first of the range, is being test marketed currently in Japan.

Finally, the company discloses that it is considering a further investment in silicon chip manufacturing. A decision is unlikely before late 1981 and Europe is the most likely site.

● See MICRO News, page 9.

Dataproducts roars ahead

DATAPRODUCTS Corp, best known in the UK for its band printers, joins Commodore and Tandem in announcing record turnover and profit increases during recent months.

For the quarter ended September 27, the company reports a 53% increase in turnover to \$65,000 million compared to the same period last year. Profits increased by 388% to \$6.6 million compared to the same 1979 quarter.

In common with other American companies reporting this week, the Data products board makes generally optimistic noises about prospects for the rest of the year. This contrasts sharply to ACT, whose chairman refused to forecast 1980-1981 prospects.

Tandem rides ahead Nonstop

TANDEM has taken off. This company, which markets the Nonstop failsafe minicomputer system, has confirmed turnover up by 95% from \$55 million last year to \$108 million in the year ended September 1980.

This is \$3 million better than predicted by industry analysts. Profit for the same period was up by 117%, from \$4.9 million to \$10.687 million.

The company pioneered and is almost alone in the field of failsafe minicomputers. The 100% increase in the installed database over the past year indicates the concept to be gaining market place acceptability at an accelerating rate.

Services turnover up 30%

ACCORDING to figures compiled by stockbrokers Green and Co from Department of Industry statistics, total computer services industry turnover for 1979 was £434 million, 30% up on last year.

The figures reveal little change in the kind of clients being billed by the industry. Public sector sources bought 12% of the industry's products, the private sector a little over 50% and the remaining billing was split evenly between inter-company charges and overseas clients.

Within the time sharing section of the industry there was an increase of 50% in bureau time sold and a 42% increase in interactive services.

There was a small increase in billing for custom-built programs delivered and a 28% increase in the sale of package programs. Education and training registered huge increases, with billings up from £5.5 million to £14 million.

Anomalies

The hardware section of the report is more recent with first quarter figures revealing that exports of complete systems are running at an annual level of £98 million. For hardware subsystems, annual totals obtained from the quarter's figures show potential export of over £940 million for the year.

Figures quoted appear to contradict industrial experience of a closer match between complete systems and subsystems and may have arisen from anomalies in Customs and Excise categories.

The body of the report deals with results from the 50 largest companies in the computer services sector and shows that BOC had both the largest turnover and highest profits last year.

A newcomer to the lists is Rolfe and Nolan, a specialist bureau in the commodity broking business. It displaces NMW from first place in the profit margin league.

Investment in Computer Services 1980, is available from Green and Co., Stockbrokers, price £75.

CW SHARES TABLE

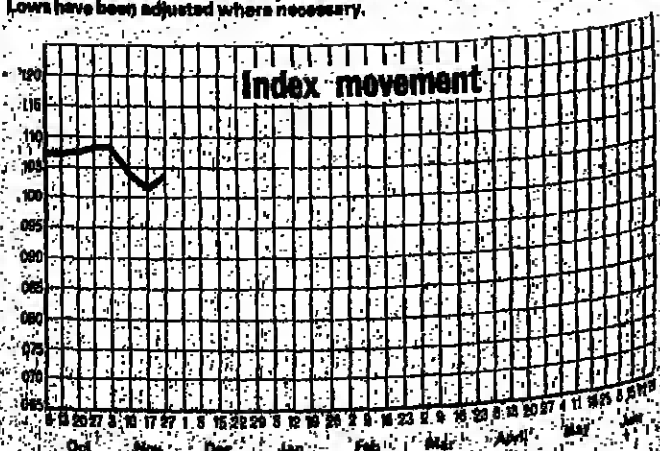
Date: 21/11/80 — Index: 104.28 Change: +8.34

Pence 1980 High	Pence 1980 Low	London Stock Exchange Stock	Pence Price	Chge
618	220	A Comp Tech (25p)	485	+50
96	56	BOC Int (25p)	86	+4
43	25	B Sov Kent (25p)	32	+3
120	78	Chubb (20p)	78	–
100	44	Cole (R.H.) (25p)	67	+13
678	540	De La Rue (25p)	806	+15
180	145	Extel (25p)	172	+2
480	224	Ferranti (50p)	460	+5
698	338	GEC (25p)	696	+18
161	113	ICL (25p)	112	–9
85	64	Kalamazoo (10p)	80	+1
346	205	Kode Int (25p)	305	–5
270	86	Muirhead (25p)	86	–12
367	231	Office & Elect (25p)	334	+3
479	322	Philips Lamp (Fl 10)	323	–4
295	108	Plessey (50p)	258	+15
190	76½	Quest Auto (10p)	190	+10
368	109	Racal Elect (25p)	368	+11
104	66	Rediffusion (25p)	68	–
374	287	Thorn-EMI (25p)	344	–16

\$ 1980 High	\$ 1980 Low	US Stocks Stock	\$ Price	Chge
29⅝	15⅛	Amdahl	38⅝	+5½
33⅝	17⅞	Ampex	32½	–¼
51	33¼	Auto Data Pro	50	–¾
84	48⅝	Burroughs	48⅝	–1½
27⅛	11½	Comp Automation	24⅛	+⅞
20½	10⅝	Comp Sciences	17½	–1⅛

\$ 1980 High	\$ 1980 Low	US Stocks Stock	\$ Price	Chge
21½	11¼	Comshare	[illegible]	[illegible]
76½	45	Control Data	[illegible]	[illegible]
85¾	63⅛	Data General	[illegible]	[illegible]
111⅜	44⅛	Datapoint	[illegible]	[illegible]
34½	10⅛	Dataproducts	[illegible]	[illegible]
99⅝	66½	Digital Equipment	[illegible]	[illegible]
37⅛	15¾	Elec Data Sys	[illegible]	[illegible]
18⅞	6⅛	Gen Automation	[illegible]	[illegible]
65¼	29¾	Harris	[illegible]	[illegible]
95⅞	63¾	Hewlett-Packard	[illegible]	[illegible]
101¼	56⅛	Honeywell	[illegible]	[illegible]
49	27⅞	Intel	[illegible]	[illegible]
72½	63¼	IBM	[illegible]	[illegible]
29⅝	10¼	MDS (Mohawk Data)	[illegible]	[illegible]
24½	8¼	Mngmnt Assist	[illegible]	[illegible]
18⅞	11½	Memorex	[illegible]	[illegible]
31¼	23¾	Modular Comp	[illegible]	[illegible]
75⅞	42¼	Motorola	[illegible]	[illegible]
49⅛	17¼	National Semi	[illegible]	[illegible]
75⅛	63¼	NCR	[illegible]	[illegible]
60	37	Perkin-Elmer	[illegible]	[illegible]
65½	14½	Prime	[illegible]	[illegible]
110⅝	80¼	Raytheon	[illegible]	[illegible]
60⅞	47¼	Sperry Corp	[illegible]	[illegible]
25	11⅝	Storage Tech	[illegible]	[illegible]
101¼	29¾	Tandy	[illegible]	[illegible]
142⅛	85⅝	Texas Instruments	[illegible]	[illegible]
85½	37⅞	Tymshare	[illegible]	[illegible]
44	9⅝	Wang Lab B	[illegible]	[illegible]
19⅝	6⅝	Wyly	[illegible]	[illegible]

The table shows the closing prices in London on Friday and in America on Thursday. The share index is based on the prices of the UK companies in the table. Highs and Lows have been adjusted where necessary.



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Phototypesetting not only looks more professional. It can make significant savings in paper, postage and handling costs because the material is presented so compactly.

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Without rekeyboarding.

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The Faster Way

Texas Instruments are making it easier than ever for you to see, try, and buy the widest range of reliable printers you're likely to come across. Now there are seven Authorised Distributors with 18 offices to offer personal, close-at-hand service to computer users throughout the U.K.

AUTHORISED DISTRIBUTORS

Comma Computers Ltd. West Horndon Industrial Park West Horndon Essex CM13 3XJ Tel:0277 811131 Telex:896786

Hamilton Rentals Station House Neasden Lane London NW10 1PH Tel:01-450 8900 Telex:885961 Branches at Birmingham, Aberdeen, Manchester and Paris

Peripheral Hardware Ltd. Armfield Close West Molesey Tel:01-941 4806 Telex:922175

Rair Ltd. 30-32 Neal Street London WC2H 9PS Tel:01-836 4663 Telex:298452

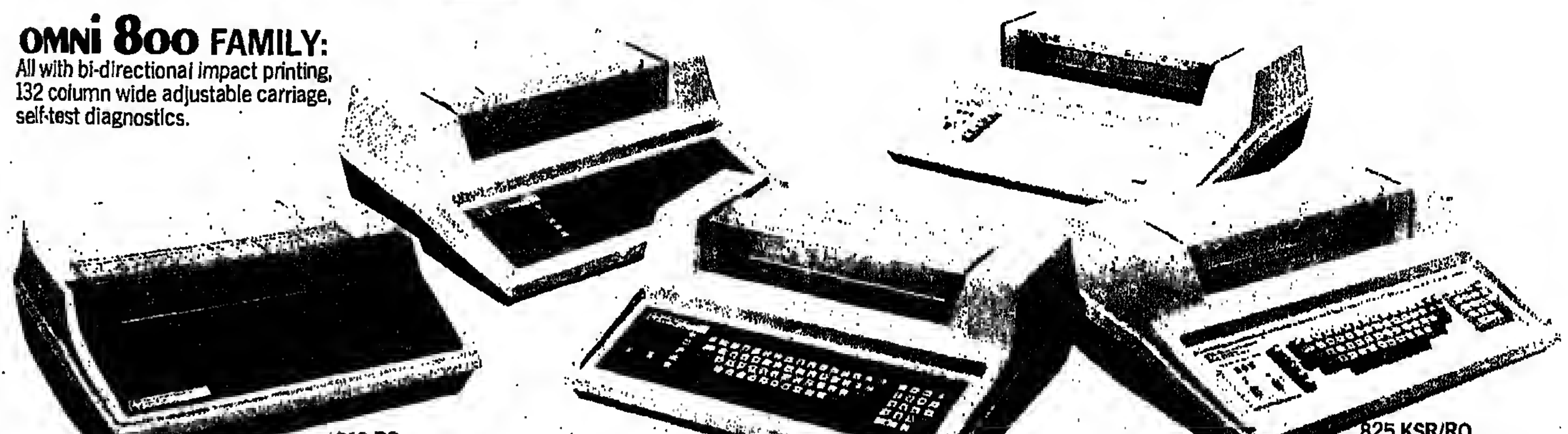
Stag Terminals Ltd. 30 Church Road Teddington Middx. TW11 8PB Tel:01-943 0777

Texas Instruments Ltd. Supply Division Manton Lane, Bedford MK41 7PA Tel:0234 67466 Telex:82178 Branches at Slough, Manchester and Edinburgh

Wilkes Computing Ltd. Bush House 72 Prince Street Bristol BS1 4HU Tel:0272 25921 Telex:449205

to a Better Printer.

OMNI 800 FAMILY: All with bi-directional impact printing, 132 column wide adjustable carriage, self-test diagnostics.



810 RO
- 150 cps printing ● 6 or 9 part printhead
- Optional compressed print and forms control
- Optional parallel interface

820 KSR/RO
- 150 cps printing ● Full ASCII character set
- 110-9600 baud transmission speed ● 1280 character buffer

825 KSR/RO
- 75 cps printing
- 110-600 baud transmission speed
- Terminal status control panel

SILENT 700 FAMILY: All with microprocessor control, 30 cps thermal printing, quiet operation, high reliability solid state printhead.

743 KSR/RO
- Serial EIA RS-232-C or dc current loop interface
- Embedded numeric keypad (KSR only)
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745
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PEOPLE and EVENTS

Board expanded at Systime

THE Systime main board has been expanded to seven with the appointment of Lawrie Collins as systems director and Ian McNeill as development director.

Collins, who has spent more than 20 years in the computer business, first trained as a programmer on the Scottish Life Assurance Co's ICL 1500. He became IIP manager, then left in 1969 to join SPL as a salesman in Scotland and Nottingham. He also set up the Dutch sales operation, and in 1971 was made UK sales manager of SPL.

In 1977 Collins moved to Systime to open the Midlands office. He then became manager of the systems department, which under his leadership has increased its turnover from about £300,000 a year to £2½ million. In 1979 he was made divisional director on the operations board.

McNeill's introduction to computers was during a post-graduate course at Lucas on engine control. In 1973 he joined Digital Equipment Corp where he spent five years, in software services and computer special systems.

In 1978 he went as development manager to Systime, then largely dependent on DEC software, with the brief of extending the company's software horizons and getting it into the system software business. His first project was the TP monitor Systel, which runs on DEC hardware and was launched in October, 1979. His brief was then expanded to include the hardware side of R&D.

DIARY

DECEMBER 1

Meeting. Computer Arts Society. 50-51 Russell Square, London WC1.

Robotics in industry. BCS East Anglian branch, Central Accounting Office, Eastern Electricity, Russel Road, Ipswich, 20.00.

DECEMBER 2

Computers and employment. BCS/IAMS. Kings Head Hotel, Rochester, 19.30.

The computer-aided art experience. BCS North-West London branch. Railway Hotel, Greenford. 19.45.

Structured programming in Cobol. BCS West Herts branch. Post House, Hemel Hempstead, 19.45.

Communication in business. IDPM Birmingham branch. Saracen's Head, Shirley. 19.30.

DECEMBER 2-3

Meeting. IBM CUA small systems group. Beaufort Hotel, Bath. Tel: 01-551 1643.

DECEMBER 3

Teleprocessing experience. BCS database users' group. New Engineering Block, University College London. 14.00.

Colour displays colloquium. IEE/BCS. London.

Computers and employment. BCS Kingston branch. Regional Management Centre, New Malden. 19.30.

Staffing and training in DP. IDPM Essex branch. County Hotel, Chelmsford. 20.00.

Distributed processing. IDPM Norfolk branch. Castle Hotel, Norwich. 19.45.

Sunderland Polytechnic's computer network. Sunderland Polytechnic. 15.00.

DECEMBER 3-4

Meeting. IBM CUA telecommunications group. De Vere Hotel, Coventry. Tel: 01-551 1643.

DECEMBER 4

Modern language translation. BCS North Staffs branch. Keele University, 20.00.

Visit to Westgate Exchange. BCS Leeds branch, Leeds.

Ideas man rewarded

Ian McCallum (below right), an engineer with ICL's customer service department in Scotland, has been presented with £1,000, the highest award in the company's corporate suggestion scheme, for research on self-diagnosis and self-correction by computers. He received the award from Alan Rousseil, director of customer engineering services.

Chris Gent has been appointed marketing manager of Baric Computing Services 18 months after joining the company as market development manager.

Derek Moore has been appointed operations manager at Hi-Tek, the Cambridge-based company set up by Newey and Eyre Electronic Distributors. He was formerly with the Jermyn group.

Michael Bennett has joined Aydin Controls as senior support engineer. He was formerly a design and development engineer with Real Time Controls. Another appointment at Aydin is Stephen Gray, who joins as support programmer. He was previously an engineer with British Telecom.

Graham Blaney has been appointed programming manager at Scope Data Systems. He previously worked for Slinn Systems. Roselie Pemberton, who also joins from Slinn, will be part of the software development team.

Victory for Logica

THE "Inaugural World Software House Golf Championship" was fiercely fought by CAP and Logica at the Addington Golf Club in Surrey, and resulted in a victory for Logica, by 10 matches to 2.

Barney Gibbons retrieved CAP's honour by walking off with the individual prize, going round the course in 81 and winning by 6 and 5.

Software houses that would like to join in the return bout next spring are invited to challenge either of the protagonists through Steve Liddiard, Logica, 64 Newman Street, London W1, or John Richie, CAP/CPP, 20-26 Lamb's Conduit Street, London WC1.

Pat Bergin has been appointed sales administration manager at VSI Electronics. He previously spent two years with Transitron.

Roger Chalke has joined Rair as UK marketing manager. He was formerly a salesman with Hewlett-Packard.

Victor Martinelli has been named vice-president of finance and administration at Informatics Inc. He was previously corporate vice-president of Max Factor.

Alan Jinks has been appointed territory manager for the City and Central London by PRCI (UK). His previous experience has included seven years with Scan, Stockmarket Computer Answering Network, three years in consultancy and a spell with IBM bureaux, before moving to a mini manufacturer.

Fred Cowie has been appointed training officer for ABS Computers. He spent five years teaching mathematics and computer studies before joining the company.

Liveware File

by Dan

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DATA ANALYSIS

Attribute type definition

Section I – Part 9

of our series describing a system design methodology

by Rosemary Rock-Evans

IN Part 8 of this series, attribute types were defined as properties or qualities of an entity type and the two types, primary and secondary, were described.

In this part, guidelines are provided on how to determine attribute types and deal with any problems which may result from the analysis.

An attribute type may belong to more than one entity type – for example the attribute type "Sex" can be a property of both the Doctor and the Patient.

In data analysis, however, it is the association of the attribute type with an entity type which is of interest to the analyst, primarily because it is this association which gives the attribute type meaning.

For example, suppose we have identified an element called "Name". Name has no explicit meaning on its own. It is only when "Name of what?" is asked that it becomes meaningful.

A more subtle example might be the attribute type "Overtime Hours Worked". This can be defined, but has no meaning until questions such as "worked by whom?" and "over what time period?" are asked.

In every case the association of "Overtime Hours Worked" with different entity types will give the association attribute type a different meaning. For example:
Total Overtime Hours Worked by Nurse in Tax Year (associated with the concept of a "Person – Tax Year" entity type)
Total Overtime Hours Worked by Department in Financial Week (associated with the concept of a "Department – Financial Week entity type)
and so on.

Considerable thought needed

Notice that no user name exists for these concepts. A name has had to be invented for the "Intersection" entity type using the names of the entity types of which they are formed.

The entity model for the entity types in the example is given in Figure 1.

These entity types are far more complex than any yet discussed and show that detailed entity and functional analysis can result in the discovery of quite complex abstract concepts.

It can therefore be seen that one major problem in determining attribute types is that of determining which entity type the attribute type is describing.

No rules can really be given for the process. Every attribute type must be examined very closely and the questions asked:
1. Which entity type does the attribute describe?
2. Could it describe any other entity type, eg, could it be an identifier of another entity type or the property of another entity type?

Considerable thought needs to be devoted to this task, as it can have considerable impact on the results of both functional and entity analysis.

In Figure 2, an example from the Hospital is given, which shows the results of asking two questions about some possible attribute types which have been found in relation to the entity type Patient.

One of the immediate results of this analysis is its effect on the entity model.

In Figure 3, the entity model after analysis is shown to highlight the effect it has had on our picture of the environment. Four new entity types have been identified: Person, Property, Patient's Illness and Illness (equivalent to a type of illness such as mumps or measles).

Four relationship types have also been identified, three as a result of the analysis and one – "Patient's Illness Resulted in Operation" – which was added when it became clear from user discussions that there was a direct association between these entity types.

The documentation of attribute types, although very time-consuming, is a fundamental part of the process of data analysis. It ensures that the definition is documented and checked with the user for correctness before design takes place. It fixes the format and rule so that a standard is available for use in systems design. It also ensures that every dependency between one attribute type and the next is recorded, so that the effect of change is apparent.

For example, if Employer's Current Basic Salary is used in order to calculate Employee's Net Pay in Pay Period and Employee's Total Shift Allowance for the Pay Period, it is essential that this dependency is documented, so that changes in, say, the format of the Employee's Current Basic Salary are also reflected in the derived attribute types which depend on it for their existence.

Magnitude

In later articles, data dictionaries and their use will be discussed in full. It is, however, worth mentioning at this point that any attempt to keep a *manual* record of all the associations and data between attribute types, entity types and other attribute types will usually fail for a system of any magnitude, simply because of the volumes and complexity of the task. A data dictionary system is in this case essential.

The typical contents of an associated attribute type form are as follows:
1. Name. The full name, without reference to purpose (including the entity type name) eg Name of Patient.
2. Synonyms. Any other names which convey the same meaning.
3. Date produced.
4. Version.
5. Analyst producing the form.
6. Status, eg draft, ratified, etc.
7. Definition. The full definition, without reference to purpose, but with reference to the entity type described, eg the surname and first two initials of the Patient.
8. Units of Measurement, eg ££, feet, em, etc.
9. Purpose. This is a possible entry, which may be known from functional analysis. It is used to explain why the attribute is relevant to the enterprise.
10. Custodian/Owner. The user department responsible for ensuring that the form is always up to date.
11. Authorisation. Department authorised to create, delete and modify occurrences, and any special confidentiality criteria.
12. Code reference. Name of the manual where the code is to be found if not attached to the form.
13. Review period. The number of years/months after which the form must be checked to see whether it is still used, etc.
14. Format and structure.
15. Validation criteria.
16. Entity type or sub-type to which it belongs.
17. Dependence on other attribute types (whether derived, for example).
18. Availability. Where it originates, whether it is derived or basic, and where it is presently kept.
19. Length of life. How long it is to be kept, ie its permanence.
20. Distribution. Who has received the form.

If the attribute type is coded, an extra sheet should be used giving:
1. Code value, eg M.
2. Code description, eg Male.
3. Code definition (if needed).

Note that general attribute types eg "Date", "Time", "Units of Measurement", etc, should also be recorded on the attribute forms, if other attribute types conform to the definition. Item 17 on the form can then be used to show this dependence.

The problems of determining attribute types have been briefly covered in this article, with some of the main guidelines which should be used to determine attribute types and their associated entity types. In Part 10, entity subtypes will be examined.

The Data Analysis methodology was developed at CACI by Ian Palmer.

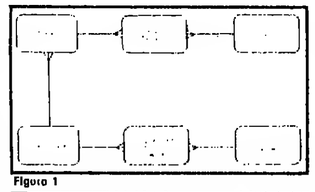


Figure 1

ENTITY TYPE: PATIENT
POSSIBLE ATTRIBUTE TYPES
Comments

Name of Patient
Address of Patient
Yes, Name relates belong to Patient. A patient does not have an address – a property that an address and a patient have in common is an attribute type of another entity type "Property", and a relationship type exists between the entity types of Property and Patient – that of "lives in".
Diagnosis
This does not describe the Patient, it describes a type of illness and the relationship of the Patient "having contracted" the illness.

Figure 2

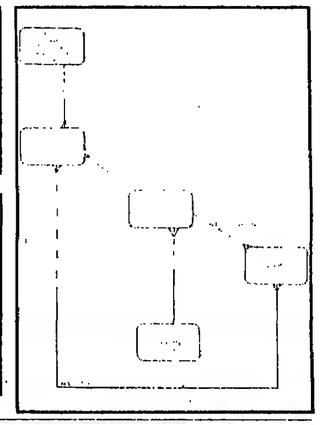
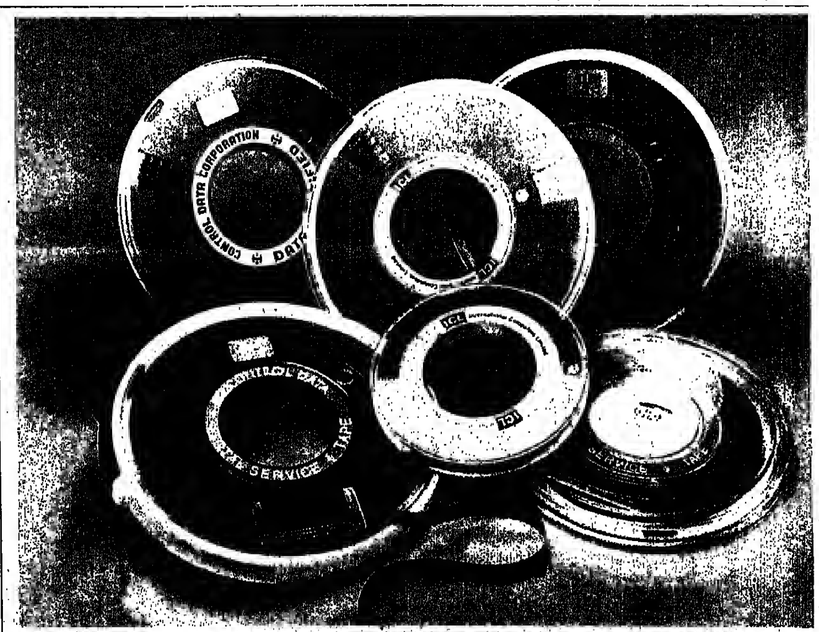


Figure 3 (right)



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The control room on production platform FD (Highland Two) in BP's Forties oilfield in the North Sea.

Developing new tools ahead of the industry

The first three articles in this series dealt with BP's use of conventional computer systems. In this final part, a look is taken at innovative uses of computing within the BP Group.

THROUGHOUT this series of articles we have only been able to sketch an overview of computer operations in BP by taking a few examples from each area of the company's operations. Against the background of some of the older, more conventional applications, we have covered some where BP has, in the past, been prepared to innovate in the computer area.

Where BP uses leading edge technology it is mostly on an experimental basis, and the company points out that most of its non-experimental computer use is merely in the sensible application of proven new technology. Without doubt, BP was one of the first major oil companies to make extensive use of linear programming techniques, and the current expertise that exists within the company enables extremely large models to be developed.

Strategy

One recent solution package produced to solve modelling problems utilises in the order of 1½ megawords of central memory while some LP programs require in excess of 10 hours' computer time even on the latest upgraded Univac 1100/82 configurations. It is techniques such as these that enable BP to organise its entire supply, demand and operational strategy worldwide.

Corporate planners are large users of linear programming within the BP group. Their role is to forecast future activities generally and to analyse new options in refining and marketing strategy. For longer-term strategic planning, BP sees LP-based models as the only way, at present, to obtain an overview of its complex trading, marketing and distribution patterns.

BP's more conventional use of non-LP financial models is currently undergoing a re-think with changing planning attitudes. The effects of international uncertainty these days are so variable that in-depth modelling for long-term strategy becomes too complex. The approach, therefore, will be to use financial modelling packages for slightly shorter-term planning against individual profit centre areas. Longer-term strategies may be based on the use of new computer techniques.

For such systems, corporate planners see no reason why they should not opt for desk-top dedicated systems with user-oriented languages which enable each strategic analyst to be able to alter and redefine the system or parts of the system within the constraints agreed with other corporate planners. Such techniques require systems that enable flexible manipulation of text as well as data. Thus, while in the short term BP is testing interactive financial planning systems such as Execucom, Total and Rapport, the longer term requirements may see the use of "expert" systems.

Corporate planners, within their individual disciplines, will also require private user files for analysing and manipulating information which can later be input into an overall corporate planning model. For departments that are relatively small in terms of numbers such dedicated systems will probably use some form of ring system, and the computer systems support group in corporate planning are already studying a variety of ring-based office systems.

There are some areas where BP is prepared to develop new software tools ahead of the computer industry itself in order to make its own users' future life a lot easier. BP Trading's computer services department has, for example, developed a suite of programs which form the basis of a new programming system which can be used by any other system either in batch or transaction mode.

Definition

PRESS (Parameterised Report, Sort and Selection System) is a total system involving the use of a data dictionary for the development of programs which can be defined by short parameter sets.

BP says that PRESS is particularly suitable for information retrieval, report formatting (including word processing), automatic validation using pre-defined data dictionary conditions, and calculations involving immediately input variables matched against stored data.

BP Oil's computer division, which was originally involved in the development of the Iris high-level programming language in the late '60s, has for the last few years been developing a new, ultra-high-level programming language called LPS (Logical Programming Syntax). BP says the language is a unique development and involves the sort of investment which is normally reserved for computer manufacturers themselves; it feels that LPS is probably ahead of anything currently available from the computer industry.

Conventional high-level languages in current use usually require a programmer to define precisely each stage of the process of manipulation of data. The exact manner in which the data must be manipulated must also be specified according to the language, in order to give the precise results required by a systems specification.

BP Oil's LPS departs fundamentally from this philosophy and enables the user to define what he requires, without recourse to the usually accepted conventions. It allows the computer itself to deduce the step-by-step logic that is required. In other words, a program can be developed using formalised statements in non-procedural terms.

LPS is proving to be a powerful tool for users of systems rather than applications programmers. It is also, says the company, extremely powerful in the hands of specialist programmers, and the experiments conducted so far seem to suggest an economy, in lines of coded statements, of up to 6:1.

But this won't be the first time that BP has been ahead of computer manufacturers, it claims. Take the case of Unitab, (based on the NCC Filetab package) of which the original development was sponsored by BP Trading over seven years ago in conjunction with the NCC.

Unitab is a batch oriented interpreter of decision table based parameters, consisting of a single skeleton program incorporating all the logic necessary to process one file for one report. A parameter is added to the skeleton for detailed requirements such as file and record definitions, processing logic, sort and output formatting /editing. Further parameters extend the capabilities beyond those of a normal report generator. Written in Assembler, it incorporates dictionary naming of data items for legibility and portability.

Unitab was adopted as the Univac version of Filetab.

BP Trading's computer services department has also had close involvement for a number of years with Michael Jackson on structured programming techniques, and structured programming is now applied as a standard technique. BP runs its own training courses on structured programming using the Jackson method.

Some areas of operations, such as the North Sea, demand the most advanced methods possible to ensure maximum efficiency and safety. For example, where land lines cannot be laid for normal communication, microwaves can be used to carry computer data.

Most oil platforms, however, such as in BP's Forties Field in the North Sea, are out of sight of land and too far away for conventional microwave links to be utilised. BP has overcome this by using tropospheric scattering which bounces microwaves off the earth's lower atmosphere.

BP's four platforms in the Forties Field are each equipped with an ICL 7502 terminal and a printer. The four platforms are all inter-linked using line-of-sight radio links carrying computer data which is co-ordinated at either one of two of the platforms and then further transmitted using the tropospheric technique to the BP control centre at Dyce in the North of Scotland.

The Dyce centre utilises an ICL 2904, and one of the most important systems is that which is used to analyse and monitor stores requirements for the platforms.

Research

The system enables online updating of files on each platform's stock records automatically from the data input from the platforms. With the tropospheric scatter system, corrupted data is overcome by using parity checks against each character in the transmitted message. Introduction of the system has considerably improved the logistics of running stores on these multiple platforms.

BP Petroleum Development's Dyce centre is currently funding some of the work being carried out at Edinburgh University's Machine Intelligence Research Unit on the "expert" systems. An expert system is currently being devised to run on a PDP-11/34 to provide a knowledge-based system of the operation of oil platforms.

This is one example of BP's many areas of involvement in the utilisation of new technology. While some of these applications may at this stage be viewed by BP as experimental, it has certainly not overlooked the need to use the latest technology as early as possible at all commercial levels in the company.

BP Chemicals has already restructured its services operations to plan and co-ordinate both data processing and information processing activities with office automation procedures, and management structures have been established to cope with the changes.

In recognition of the interaction of the various applications of microelectronics, not only within each BP company, but in the group as a whole, a new management function has been set up to be known as Information Systems Administration. This is a head office corporate level activity, the aim of which is to co-ordinate all information processing strategies (including telecommunications) throughout BP.

While the company does not see any particular [illegible] in hardware or systems in use, the early use of new technology has already been carefully considered. The complexities in planning information communications networks, for an organisation the size of BP, are immense. The first principle, therefore, is the establishment of information network protocols.

BP has already narrowed its communications options down to about four serious possibilities for a UK network architecture which will probably make extensive use of distributed processing and be based on a ring-type communications system. The company is evaluating systems such as IBM's SNA and the forthcoming Univac DCA network architecture. BP has also had discussions with British Telecom on System X, and is constantly monitoring all other international PTT network developments.

New office areas, such as BP's new headquarters building which it intends to move into next year, and new buildings at the Research Centre in Sunbury, are all being fitted with ducting to allow total electronic office use. In such advance planning, even fibre optics have been considered and BP Oil is currently installing fibre optic links in its headquarters.

Many areas of information technology organisation and implementation are being considered. The Research Centre Library, for example, currently contains some 11 million records—thus a large information retrieval system combining the latest IR techniques as well as microfilm will need to be developed, together with associated communication for appropriate users throughout BP.

As yet, no specific decision has been made on any standard form of office automated systems, but most options being considered, or in a few instances used by some departments within BP companies, tend to favour ring systems. As far as any specific ring system is concerned, BP could opt for a number of possibilities.

Scicon, for example, is investigating Demos technology. In a joint venture currently undergoing trials at the National Physical Laboratory, using Intel 8086 multiple processor configurations programmed in Pascal, a range of different architecture possibilities based on the Demos high-speed ring technique is being studied.

This method has significant potential, particularly in the area of automation, and could be one area where BP might well use ring systems, the implementation being relatively smooth as Scicon already has its own facilities to burn programs on to chips.

The first real significant move within BP, as far as electronic office and ring systems are concerned, is at BP Oil in Hemel Hempstead which, this month, implements on an experimental basis one of the first Xionics integrated data management networks.

First step

It will use 18 terminals and is the first step towards a complete automation system, a total system leading to a number of "paperless offices". The system will handle everything from electronic mail to diaries, data and word communications.

Xionics believes that its system will be suitable for use on an international basis by multi-national companies. The technique uses twin parallel rings called Xinets which enable up to 4,000 international sites to be served. The system itself, called Xibus, is operated through the Xinet. The Xibus uses special and general purpose processors.

The Xibus system, which includes Winchester disc drives, controls a number of multi-function VDUs which are linked via one or more Xinets operating at one megabyte a second. The Xibus makes extensive use of parallel processing and has a minimum [illegible] million instructions per second.

Control room at BP's Dyce centre, Aberdeenshire.

BP's tropospheric scatter terminal at Brimond Hill, near Dyce. The aerials, 30 feet in diameter, are beamed in the direction of the Forties oilfield. The system provides a multi-channel link between the shore base and the offshore platforms.

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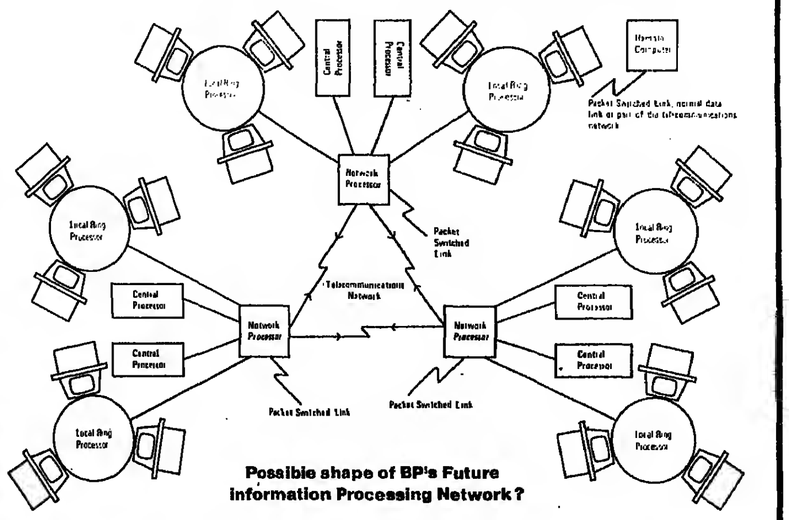

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The lack of specific IMS db/dc expertise, however, has caused a number of different new positions to be created — ranging from IMS/COBOL Programmer to Project Leader and Software Systems Programmer positions. In each case, in-depth knowledge and experience is expected and must be combined with the ability to put ideas across effectively and fluently.

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Two newly created positions for Project Leaders are currently available with this growing and developing software house in Central Bucks. Candidates must already have experience of running projects and teams to tight time schedules, although not necessarily in a software house environment. Additional management experience of setting and defining budgets would naturally be of value, although not mandatory.

Technical expertise required is fairly non-specific although should cover on-line or real-time systems and use of high level languages on minis. Naturally, extensive analysis and design experience is required and applicants must be able to demonstrate a flair for dealing with users or clients.

'Distributed Systems' Analyst

Producing designs for a country-wide system.

London E.1. — **to c. £10,500 + BONUS**

One of the best known service and manufacturing companies in the UK are in the process of building a fairly large mini-based distributed system on which a complex and comprehensive sales order processing system is to be implemented.

The current requirement is for an experienced Analyst to join the design team, in a "Business Analyst" role, to contribute significantly to producing the systems design. The expertise the company lacks at present is in the Sales Order Processing field, so candidates must have completed the design of at least one similar system. Obviously, additional knowledge of minis and/or distributed systems is essential to the job.

Relocation and other large company benefits available.

Field Engineers

Find out how your career prospects can be enhanced.

London & South — **c. £8,000 + package**

Modus has been inundated with requests by several major organisations to recruit experienced Customer and Field Service Engineers. The need to provide reliable and self-starting front line engineers has also been recognised by smaller and growing companies and some superb opportunities exist in this type of environment.

Primarily, we are seeking trained and experienced component-level technicians who can be relied upon to diagnose and rapidly provide a solution to hardware problems. An ability to devise and use diagnostic software would be a bonus.

Modus is keen to hear from any engineers who believe they can contribute to our client's needs, and a full discussion is welcomed. Most requirements are in London, Home Counties and Southern locations.

Micro-Software Designers

A growing number of interesting and varied projects.

Germany - Europe — **£18,000 to £25,000**

Modus has been exclusively retained to recruit a number of experienced micro-designers for projects in West Germany, Belgium and Holland. Preference will be given to applicants who also have a background of software or technical systems design experience on mini-computers.

A thorough knowledge of the Intel 8080 range of software and hardware is essential, including MOS usage. CHILL, ASSEMBLER plus high level languages such as PL/M, PASCAL or BCPL are likely to ensure definite interest from our client. All projects will extend for at least 12 months with every chance of extension or alternative consultancy work subsequently.

Some kind of tertiary qualification is very desirable (HNC minimum) but experience and cognizance of micro design technology is paramount.

Fortran Compiler Expert

To design and produce a new Fortran compiler.

S. Germany — **£20,000 to £25,000 min.**

Our client is a small, specialist, wholly German based software house which numbers among its customers, the largest and most prestigous European computer manufacturers.

The company currently has an urgent requirement for a FORTRAN compiler designer to join their ranks, to build and implement a new compiler. Naturally, extensive experience of compiler design and of FORTRAN are the primary criteria, whilst a thorough knowledge of optimisation techniques completes the picture of an ideal candidate.

Considerable help with relocation is given and the salary on offer is highly attractive even by German standards, especially when the current exchange rate is taken into account.

CICS Support Programmer

Advising project teams on CICS systems design.

Hertfordshire — **£8,000 to £9,000**

This is an ideal opportunity for a young programmer with 2-4 years experience of CICS systems, to utilise such expertise in helping an installation convert all development to CICS-DL/1. Obviously DL/1 database experience would also be of value, as would knowledge of COBOL and JSP techniques, although experience of any formal structured programming will suffice.

The company runs two 370's under DOS, one of which is shortly to be replaced by a 4341 and the other kept purely for development work — both with DOS/VSE.

Promotion prospects are superb — especially since this is a unique, new position — with the next step up automatically meriting a company car. All usual large company benefits, including BUPA-like medical cover.

Australia

A service for committed emigrants to Victoria or NSW.

Call us for direct contact with a leading consultancy in the Data Processing marketplace for all levels of staff in permanent career orientated positions. We are primarily interested in Programmers, Analysts, Project Leaders/Managers, Customer Service Engineers, and Sales Personnel. Note that we do have definite requirements from some of the leading companies in Victoria/NSW and applicants will be advised accordingly — this particularly applies to Customer Engineers with Univac or Honeywell experience.

Modus will provide advice and offers personal administration of your introduction to a choice of jobs in Australia, commencing with an interview with one of our consultants. We can also advise on the logistics of moving to Australia.

Consultants: — Mike Creamer or Andy Wright

If the advertised positions do not match your experience or aspirations, Mike and Andy are always available for a confidential discussion of the possibilities. An informal meeting — often an essential part of the process — can be quickly arranged.

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Have you considered spending a period in the Middle East? This could make a dramatic improvement in your finances, and at the same time widen your experience in an IBM mainframe environment.

Acting for clients, a major international oil company, we seek systems analysts with:

- from six to eight years' analysis experience, including feasibility studies and/or systems engineers.
- degree in business administration, computer science, engineering or equivalent.
- ideally but not necessarily — knowledge of Inquire, Mark IV or other high level query language.
- ability to communicate effectively both orally and in writing.
- good problem-solving skills relating to computerised commercial/industrial applications.

The applications are complex, including accounting, performance indices, auditing, inventory control and order tracking.
Employment is on an indefinite term basis and provides real career opportunities. Benefits include air-conditioned accommodation, excellent sporting and recreational facilities, and free medical care.
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Salaries quoted are net of deductions and include various allowances. There are no restrictions on transferring earnings overseas.
Please ring us for a discussion and an exchange of information, quoting reference 283, Telephone calls after hours will be recorded.

(3791)

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CUMBRIA COUNTY COUNCIL
CARLISLE TECHNICAL COLLEGE
DEPARTMENT OF SCIENCE AND GENERAL STUDIES
LECTURER I COMPUTER STUDIES
required from January 1, 1981, or as soon as possible thereafter.
Applicants should have appropriate qualifications and experience to teach on GCE O, GCE A, NCC Threshold or BEC/TEC Computer Studies courses. Ability to offer Cobol/Data Processing/Mathematics an advantage.
Salary Scale £4683 £8055.
Further details and application forms returnable by 12 December, 1980, from the Principal at the College, Victoria Place, Carlisle (3708)

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We teach the Royal Society of Arts Computer Operations and Computer in Data Processing syllabuses and require a Lecturer for SATURDAYS ONLY.
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Based on the computing power of 25 dual-processor DEC system 10's, we market a time sharing service in all of the major business centres in America and Europe. A new extension of this service, ADP/ONSITE, puts a software compatible 36 bit processor on client sites, whilst retaining all of the network benefits.

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£7,000 to £11,000 + car or car allowance

We have site and field service positions available. We look for engineers capable of chip level repair of large memories, 200 mbyte disks, 6250 bpi tapes and across selection of CPU's. You will join one of our teams and be trained to work in an environment where results count.
All positions carry BUPA, contributory pension scheme, etc.
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South Coast

Software Engineers
SALARY UP TO £8,000 + BONUS

Principal Software Engineer
SALARY UP TO £9,200 + BONUS

+ RELOCATION ASSISTANCE

Major Micro Development Programme

We are an expanding division of a major Group based in Hampshire. We are about to embark on a number of significant developments in the areas of micro control and surveillance, using a range of micro computers including the INTEL 8086, we also construct simulators based on DEC PDP 11's used for training.

We require programmers with 3-4 years experience for the engineering posts and in excess of 5 years experience for the Senior position. Fluency in CORAL 66 is preferred, but experience of process control and real-time systems in a Defence or Aerospace environment would be acceptable.

We are entering an exciting phase in our Company's development which will afford both interest and career opportunities. We are offering an attractive relocation package to this area of the South Coast providing an attractive blend of amenities.

FOR MORE INFORMATION ON THESE UNIQUE POSITIONS, CONTACT:
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Specialist Computer Recruitment Ltd

Nobody develops a taste for champagne by crying into their beer!

"
- **The economy is getting blacker**
- **Christmas is looming nearer**
- **high interest rates**
- **rising unemployment**
- **future career looking bleak – sounds familiar?**

Not at Marcol

I believe this country still has the best talent in the computer industry. British analysts and programmers are some of the shrewdest, sharpest thinkers I've ever met – and I should know, I work with them.

Marcol employs over 200 men and women who work in teams on projects which are the envy of the competition whether in the UK or Europe.

The people who work for us are rich – not just in high income and profit sharing partnership terms but also in job satisfaction and career opportunities. That intellectual commitment has helped turn Marcol into one of the country's most aggressive and successful software companies – indeed we are one of the top 5 independents.

Right now, I'd like to find more people like them – people who wish to share in our future. The opportunities within Marcol for the 80's will brighten up the holidays for you and will give you the optimism and enthusiasm I feel.

We're looking for a wide range of people from junior programmers to senior executives, salaries from £6,000 to £18,000. So, if you have 2½ years or more D P experience, would like to talk about your future and perhaps celebrate your Christmas with champagne and not beer – telephone Penny Bailey, our Resources Manager – and whet your appetite for success. "

Martin Brody, Chairman

Marcol Computer Services Ltd.,
60 Queen's Gardens, London W.2.
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Computing Services Association

MARCOL

Dynamic systems for tomorrow's needs

JBA

Application Software Sales

London, Scotland, S.W. England earnings £16,000+car

A company whose software applications products have enabled them to establish an enviable reputation throughout the U.K. seek further marketing representatives to the above areas.

Applicants should have D.P. Sales experience but those currently occupying related positions will receive serious consideration. The successful candidates must have the ability to deal with client personnel at all levels and will possess a steady and dependable attitude towards maintaining sales performance. Effective formal training is available as appropriate. Excellent incentives supplement a high basic salary.

Contact: Mike Gaitskell

Sales Executive

U.K. Earnings c. £15,000 + car

Following the successful launch of a new and impressive training service an established computer services organisation is seeking an additional Sales Executive. The service is available throughout the U.K. via an established U.K. network and is based on a software product with powerful conversational and graphical capabilities.

Applicants aged 30-40 years should have a professional attitude with a proven sales track record of at least 3 years. A knowledge of the "training scene" would be very desirable but the drive and ability to sell effectively at all levels is much more important.

Contact: Bev Stevens

Programmers and Analysts

Bristol

A world famous advanced engineering company is seeking analysts and programmers for their commercial systems development department.

Senior Programmers to £6,600 Jan. 1st Review

With 3 or more years experience in commercial applications using COBOL preferably on IBM hardware. Leadership and good communication skills are vital.

Systems Analysts to £7,300 Jan. 1st Review

Time Systems Analysts, preferably degree or equivalent level and with either commercial Programming or Analysis experience. Self-starters, capable of maintaining a high level of user liaison, and dedicated to seeing systems through from inception to implementation.

Contact: Bob Male

Systems Software Opening

Nottingham £ Depending on Experience

An opportunity exists for experienced applications programmers or systems programmers to move into the system software field. The organisation which is well known and highly respected has a large IBM mainframe installation running under MVS.

Applicants should have a good educational background and at least 2 years programming experience, combined with a sound knowledge of IBM Assembler.

Contact: Bev Stevens

Senior Systems Analysts

N.W. Birmingham To £8,500

The Computer Services Centre of a large manufacturing organisation requires additional Systems Analysts at a senior level to work on a range of commercial and manufacturing systems. Data Base and On-line applications are being developed and the successful applicants will be closely involved with users in the design and introduction of systems appropriate to them.

In addition to sound business systems analysis experience a COBOL programming background is required and an understanding of ICL operating systems.

Contact: Peter Bowen

Senior Systems Analyst

Borehamwood c. £8,000

A sound business systems analyst or analyst/programmer is required by our client. Commercial experience and the ability to handle a wide range of on-line applications with close customer liaison are other essential features of this vacancy which could lead to Project Leadership given appropriate levels of experience.

Specific hardware background is not important although familiarity with IBM management systems would be useful. The company offers excellent prospects for an enthusiastic and go-ahead person.

Contact: Peter Bowen

Programmers

Birmingham To £7,000

This city centre IBM installation is looking for COBOL programmers with a minimum of two years experience. Applications will be varied but will include Teleprocessing and On Line systems. A knowledge of IMS, MVS, TSO or SPM will be advantageous. Promotion prospects are self-determined within this secure environment.

Contact: Christine Pountney

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UCA

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An established market leader wishes to expand his penetration of the mini-micro market by establishing Senior Salesmen to take charge of existing accounts whilst obtaining new business. A real chance to match your efforts with reward and managerial promotion after a reasonable period is well on the cards. CW48/1 Michael

SYSTEMS ANALYSTS

£6,000-£9,500 NEAR COLCHESTER

A major international company with the latest IBM DOS/VS CICST/P DL1 installation is keen to recruit ayatems analysts (with a programmer background) at variaua levels to work on brand new financial projects. The company offers exccilent perks including flexitime, non-CPS, a concesaionary rato mortgage assistance, and relocation expensos to thia beautiful part of Essex. All you Programmer/Analysts apply now. CW48/2 Michael

MANUFACTURING ANALYST

Ralgate £8,500 to £10,000

If you have a manufacturing applicationa systems background please giva me a ring. A very profitable client of ours if urgently looking for the right person to implement naw ayatema. Here is the chance for a more Junior Analyst/Programmer to move into pure systems work. There are tha usual large company perks including an excellent S & S club and a proper syatem of promotion. CW48/3 Michael

INSURANCE ANALYST

City £10,000

A major insurance company is expanding its preaent on-lina Honeywell installation and investigating brand-new financial management information systems. You should ba a major contributor to thair new plans. Excellant perks include annual bonus, fraa BUPA, free lifa assurance and 50p LVa per day. CW48/4 Michael

SENIOR PROGRAMMER

N.W. LONDON TO £8,500

A major food processing organisation has installed the latest Honaywell Level 64 and computer and requiras a programmer with supervisory experiance. They use remote data capture via a telecommunications network. If you have two years' or more COBOL and wish to really advance your career, apply now. CW48/5 Tricia

IBM SUPPORT PROGRAMMER

Hampton TO £11,000

A very major IBM Service Bureau, part of a multi-national organisation is looking for a presentable, verbal profesional able to conduct sales courses and demonstrations to clients. Past experience should include COBOL, FORTRAN, or PL1m under OS with JCL knowledge would be an added advantage.

Absolutely auper perks and prospects looks excellent. CW48/6 Michael

IBM SYSTEMS PROGRAMMERS

HOME COUNTIES TO £12,000

How popular you are! All you naed is a technical IBM background with relevant IBM DOS/VSE or OS/VS1 or VS2 experience to commsnd a very good salary. Wa now have vacancias in ESSEX, SWINDON, N. LONDON, CROYDON and the CITY. Remambar you can mova into these jobs from an applications programming area, provided it is more than 18 months' worth. Plaasa telaphone for mora details and an informal chat. CW48/7 Tricia

RECRUITMENT CONSULTANT

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UCA are a well-established recruitment consultancy with an excellent reputation within the computer industry. Wa now wish to appoint an applicant with a computer background and with a good outgoing personality to handle our increasing permanent and freelance client business. It is unlikely tha successful candidate will be under 25 years of age. CW48/8 Michael

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ICL	2950 DME COBOL	3 mths	SUSSEX
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IBM	CICS COBOL DL1	3 mths+	LONDON
IBM	1.5 IMS/MVS SYST. PROG.	3 mths+	SWEDEN
IBM	4341 COBOL CICS DOS	6 mths	BRUSSELS

Phone Irene for details

UCA Recruitment Consultants
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Maidenhead

TOTAL — the most successful independent database management system ever produced, a system which operates on 28 different computers under 40 separate operating systems, has well over four-thousand established users and is designed to promote distributed processing.

The tremendous success of Cincom's product range has now created a demand for additional personnel to work on either development or support of the DEC PDP 11 and VAX products.

For each of these positions a sound background in DEC software is necessary, including experience of MACRO-11 and either RSTS/RT11 or RSX11-M. Immediate terms of employment are extremely good and long-term career prospects are bright. The company is successful and these are excellent opportunities for you to contribute to, and share in, that success. Telephone Myriad on 01-353 0981 now, to discuss your future with Cincom, or write quoting reference SW3/2711/CW.

PRODUCT SPECIALIST c. £11,000 + Car

You will become a specialist on the application of Cincom software products to the mini-computer market. This will involve both pre- and post-sales support activities including the presentation of products to prospects and overall systems consultancy. This is a senior position for which you will need to offer around FIVE YEARS' experience of mini-computer systems including a DETAILED TECHNICAL KNOWLEDGE of DEC PDP 11 software.

SOFTWARE DESIGNER c. £11,000 (+ Car)

Offering at least FIVE YEARS' RELEVANT MINI-COMPUTER SOFTWARE EXPERIENCE you will become involved in the development of Cincom's products for the DEC range of hardware. A high commencing salary is available and you will be eligible for a company car after a short period.

TECHNICAL SUPPORT PROGRAMMER c. £9,000 (+Car)

This involves providing detailed technical assistance to established users. TWO YEARS' or more sound MACRO-11 experience is required and you will be eligible for a company car once the initial training is complete.

SYSTEMS ANALYST

LONDON

£8,000 to £11,000

An outstanding opportunity exists for a Systems Analyst to join the development group of a highly successful international organisation, with its headquarters located in Central London.

The group is responsible for the development of an interesting and varied range of new systems for the investment trusts and bonds aspect of the company's operations throughout the U.K. and Europe, providing vital business information to more than 180 users. An extensive communications network links the users, facilitating rapid interchange of information and providing each location with remote processing facilities.

This is a first-class opportunity for Analysts seeking a career move to gain valuable experience together with the opportunity for project leadership in a dynamic organisation.

Prospects for future career progression are excellent providing scope for individual development, and our client envisages a high starting salary together with excellent fringe benefits.

REF. E1/2711

A PROGRAMMER

LONDON, W.6

To £7,500

This is something different; an opportunity for a young programmer with a real interest in computing to escape from the routine of project development in a large team and join a small group providing a range of computer services and support to users.

The company is a major petro-chemical and energy resource engineering organisation which has an impressive record of growth and success throughout its history. That success is continuing today and as a result demands on the computer services department are very high. Large IBM and Univac mainframes are used for major systems but a range of smaller computers for specialised applications are also used.

The person appointed will ideally have some experience of COBOL and/or Univac 1100 systems and will provide diverse support services to users as well as developing small systems from inception to implementation. This is an unusual position which offers excellent personal progression, good conditions of employment and provides every opportunity for career development.

REF: SW2/2711/CW

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On behalf of a major American construction engineering company we are seeking two senior people to fill key roles within the U.K. Information Services group.

INTERNAL MIS CONSULTANT: TO £13,500

The person appointed to this position will be responsible for optimising existing computer facilities and for promoting the use of computer and information resources throughout the company. This will include the assessment of new technologies as they become available. A wide variety of applications are currently in use, based on large Univac and IBM mainframes, IBM and ICL mid-range computers, Harris and Redifon small systems. The ability to appreciate computer developments in the broadest sense and to communicate with very senior user management is imperative. Experience of an engineering company environment will be advantageous.

PROJECT CO-ORDINATOR: TO £11,000 (NEG.)

This person will be responsible for the co-ordination of local computing at project sites in the U.K., the Middle East, Far East and North Africa. Hardware used includes IBM System 34, System 38 and ICL 2903/4, running a full range of project control applications. The successful candidate will offer experience in business planning, project scheduling and control and, ideally, a technical background relevant to the hardware in use. He/she will hold managerial responsibility for a small team of Analyst/Programmers and must display the ability to communicate and liaise effectively with all levels of user management.

Despite the world recession this organisation has remained particularly successful and is able to offer genuine career progression at management levels to the successful candidates. A high commencing salary is offered and benefits include free life assurance, interest free season-ticket loan and relocation assistance. Write quoting reference SW1/2711/CW, or telephone the number below to discuss these positions in detail.

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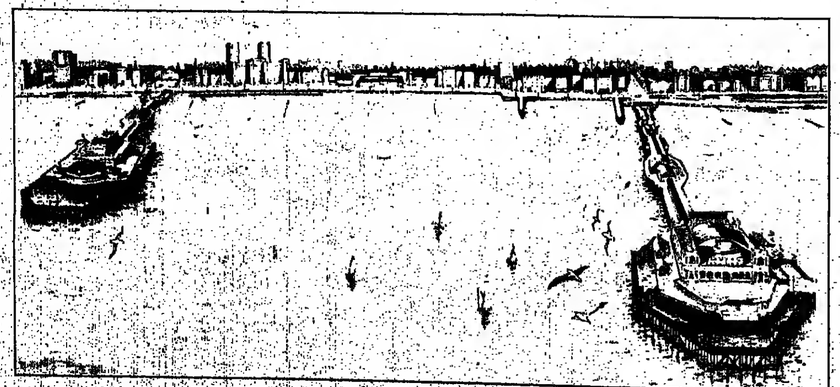
JOBS WITHOUT PEER IN A TOWN WITH TWO PIERS



With the ever changing technology in the telecommunication field, we at ITT Creed Limited, part of ITT Business Systems Group, want to expand our Software Department, which will be embarking on a new project early in 1981.

As a result, there is a need for EXPERIENCED SOFTWARE SYSTEMS DESIGNERS to join our team at the design stage of the project. It is your chance to be in at its birth and work through to a position of team leader during the implementing and testing phases of the product. One of these senior people will be biased towards the quality control and testing aspects of the project.

If you have had several years' experience in Software Systems Design and have specific knowledge in any of the following, we would like to hear from you:

- embedded operating systems
- text editing or word processing type applications
- communications, line handling, networking protocols
- software development for Microprocessor target H/W

Our development facilities are based around a PDP11/70 running the UNIX operating system.

These positions may involve some international travel to liaise with our sister company. You will receive a competitive salary and the prospects for a talented designer are very bright. Some of the many benefits offered include 25 days holiday and a generous relocation package if it is necessary to move to the Brighton area, which in itself is a bonus.

Please send full career details to Mr. Ray Hooker, ITT Creed Limited, Crowhurst Road, Hollingbury Industrial Estate, Brighton, Sussex, or telephone Brighton (0273) 507111 Ext. 3514 for an application form. (Answering service after office hours is available).

ITT Creed Limited ITT

JBA

System 34 Specialist

Surrey **£10,000+**

Only very occasionally does an opportunity arise to join a world wide organisation and take control of their U.K. installation, from operations through to the development of systems.

This position calls for a combination of organisational and technical abilities and a substantial degree of self motivation. In a position of wide responsibility.

Background must consist of extensive IBM systems 34 experience encompassing operational and RPGII programming skills also the development and installation of manufacturing modules and systems. Practical knowledge of MAPICS is desirable.

Prospects are exceptional, and opportunities will exist to develop a career within a world-wide manufacturing corporation. **Contact: Janet Chilvers**

Honeywell Level 6

West of London **to £12,000+car**

Experienced PROJECT LEADERS are urgently required by this small but rapidly expanding systems house to control newly forming teams and to handle projects from feasibility through to on-site implementation.

Current applications cover the financial, production and commercial system areas with the client base being around London, making mobility and self motivation pre requisites.

Specialist knowledge must cover 11, level 6 minis under TPS, GCOS Mod 200 or 400 and COBOL in a real-time, customer contact environment. Sound design and analysis skills plus knowledge of SCREENWRITE are equally important.

Excellent package offered plus relocation to the right applicants.

Contact: Brian Postles

Design Consultants

London **c. £12,000**

A well established consultancy organisation is planning a major expansion in their Videotex systems activities and therefore have opportunities for Senior Consultants to join the team.

Candidates should ideally be graduates with a minimum of 10 years in computing – at least three of those spent recently in communications/packet switching. Knowledge of X25 a distinct advantage.

Ability to work with clients, analyse their requirements and relate these to Videotex as well as design new systems/networks of systems, or enhancements to existing systems, is essential. Opportunities for international travel. **Contact: Jim Baker**

Marketing Consultant

West London **up to £12,000+car+European travel**

We have been retained by a leading marketing organisation to recruit a senior consultant who will be responsible for investigating and reporting on the marketing activities of the data processing industry in Western Europe.

Candidates must have a minimum of five years experience in data processing preferably with knowledge of IBM products. **Contact: Isobel Bruce**

Project Leader

City **to £11,500**

Our Client, a world-wide insurance organisation, wishes to recruit a senior computer professional capable of taking full responsibility for specific projects.

Candidates must have had at least five years in systems analysis, including considerable experience of large systems, from feasibility through to implementation. A background of project management and the ability to deal with users at all levels is essential. A degree or professional qualification, coupled with a knowledge of database techniques and terminal based systems would be a definite advantage. **Contact: Isobel Bruce**

Systems Analysts – Insurance Systems

Rural Hampshire **to £9,500+Mortg. Sub. etc.**

A large and expanding Insurance Company are seeking additional Systems Analysts to strengthen project teams involved in exciting design and development work.

Current configuration includes Redifon mini and Burroughs B6800 mainframe.

Incorporating batch systems and on-line testing facilities.

A business systems involvement, including 2 years systems analysis and experience of COBOL, are the main qualities sought.

An excellent benefits package includes mortgage subsidy, generous relocation expenses, low interest loans, plus others. **Contact: Brian Postles**

Analyst/Programmers c. £9,000
Senior Analyst c. £10,000

London

A leading clothing manufacturing Company based in North London are looking for computer professionals to maintain and develop their HP3000 and IBM 370/138 machines.

Applicants must have at least 3 years experience in data processing and have a good knowledge of the HP3000 using COBOL. An exposure in databases is an added advantage. A sophisticated real-time system is incorporated, so an understanding of this technology is desirable. **Contact: David Hendry**

Excellent salary and fringe benefits are offered.

Analyst/Programmers

Middlesex **up to £10,000**

Our Client, a leading computer systems consultancy are looking for an Analyst/Programmer with a minimum of one years experience in a commercial DP environment using small interactive computers, programming in a high level language.

The successful applicants will be required to liaise with clients during specification, development and installation and to provide on-going support for further systems development.

Good salary plus excellent career progression is offered.

To compliment the above position they also require a Senior Analyst/Programmer who, coupled with above should also have been involved in the design of one major system from requirements study through to implementation.

Ideally, candidates should have project leader and technical sales support experience but this is not essential. An awareness of current hardware technology and trends is also desirable. **Contact: David Hendry**

JAMES BAKER ASSOCIATES,
International Personnel Consultants,
32 Savile Row, London W1.
Tel: 01-439 9311.

Recruitment Consultant

Looking for a change?

If you are a successful recruitment consultant with a desire to develop some of your own ideas, earn more money, be part of a smaller growing company, or for some other reason wish to make a change, contact me to talk over the possibilities.

Real-Time Technical Programmers

Expanding, successful companies.

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Several clients have requirements due to continued expansion. Technical systems programmers at various levels from 1 to 5 or more years experience should apply.

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Wide *scope* of development assignments, *opportunity* to build and develop your own group, *encouragement* to innovate with new ideas, is this for you? If you have proven systems software experience, have *managed* a technical team and can demonstrate an *enthusiastic* approach, I suggest you make an early application.

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Successful International Engineering Company

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Programmers with PDP11 and/or M6800/6809 assembler level programming experience.

Engineers with digital and analogue design experience. Several vacancies exist in a number of different project teams working on graphic arts and print control systems.

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Attractive location **to £11,000**

Our client is seeking two experienced computer specialists to provide installation support at sophisticated computer communications sites in the U.K. The software specialist will have wide telecommunications knowledge, the hardware specialist will have wide peripheral and CPU experience including telecommunications. Extensive overseas product training given.

Apply in confidence to Terry Harvey by sending personal and career details, or contact him for an application form, evenings Gt. Missenden (02406) 4705 or daytime as below.

HR Harvey Recruitment
Executive and Computing Personnel Consultants
500 Chesham House, 150 Regent Street, London W1R 5FA. Tel: 01-734 5351

TECHNICARE INTERNATIONAL LTD.

has the following overseas vacancies

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c. £12,000 + Allowances

Technicare International Ltd wishes to employ an engineer to maintain a microprocessor-based Supervisory Control and Data Acquisition System which has been installed by our client, a major European oil company. In an attractive Gulf area.

The position will be filled by a man who will be recruited for a minimum of one year on bachelor status with generous leave.

Technicare will also be interested to hear from the following to fill possible vacancies in the New Year:

1. Computer engineers with DEC experience.
2. Fortran Programmers with experience of Management Systems for postage equipment in the U.S.A.
3. Computer Technicians with microprocessor experience, preferably Radlan.

Please apply for application form to: Technicare International Ltd., Northbrook Place, Northbrook Street, NEWBURY, Berkshire RG13 1BR Tel: Newbury (0635) 32200.

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These supermini manufacturers/turnkey houses are growing at 60% p.a. — or better. New powerful hardware — new applications — new markets — all providing new opportunities in Service and Support for experienced computer engineers.

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Big systems house with UD backing. Systemel engineers joining now will be selected for the new 196 I Support team on large/advanced mini systems — a unique career opportunity!

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World No. 1 on scientific superminis — 2,000 installed — continued sound growth + successful, friendly management mean progress and recognition second to none!

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Active mini developments — two new products per month this year — with on-going training for professional engineers working to component level.

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PROGRAMMERS

London IBM Cobol/PL1/Mark IV

Tel: Roger Barnes on 01-828 4200
486 Copthall Avenue, EC2R 7DA SIDA

Systems Engineering Programmer

Oil and Gas Industry

Conoco Limited is a wholly owned subsidiary of Conoco Inc., the international oil and energy corporation.

Its Natural Gas Division, which comprises north sea production facilities, a supply base at Great Yarmouth and a gas processing plant at Mablethorpe, Lincolnshire, provides 12½ per cent of the country's gas.

The diversity of the operation provides a challenging environment for the Automations Software Group at Mablethorpe and as a result of a vacancy arising we are now seeking to recruit an experienced Systems Engineering Programmer.

The position involves the implementation and maintenance of software and hardware support for a multi-microcomputer data acquisition and control system, which is currently being developed for the Viking Gas Field. The equipment is INTEL 8086 and 8080 based, and uses a MASCOT Executive.

The ideal candidates will be graduates in Electronic Engineering. Salary and the overall terms and conditions of employment are excellent. Assistance with relocation is available where appropriate.

Please telephone or write for an application form to:-

Paul Tock,
Assistant Personnel Officer,
CONOCO LIMITED,
Viking Gas Terminal,
Mablethorpe, Lincs.
Tel: Mablethorpe (05213) 3553 ext. 132.

conoco
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Data Control Supervisor

£6,275–£7349 + Metropolitan weighting – Enfield

Eastern Gas at Enfield have just restructured various activities within the Management Services Department at their modern Tower Point offices in Enfield and now have an important position available in the Data Control Section.

Responsible for the day to day running of one of two Sections under the direction of the Data Control Officer, he/she will be mature and sufficiently experienced to be able to organise the daily batch work flow and re-runs, ensure training schedules are implemented and processed and that sections are manned adequately.

To qualify for this responsible position applicants should have a knowledge of 1900/2900's, at least four year's relevant Data Control experience, two of which must have been in a supervisory capacity. There are definite career opportunities for someone who can learn quickly and is excited at the prospect of working on new machines and advanced systems.

Salary offered is in the range of £6,725 – £7,349 + £536 p.o. metropolitan weighting and a range of generous benefits, including subsidised staff restaurant, pension and sick pay schemes, etc.

For an early interview please contact: **The Personnel Department, Eastern Gas, Tower Point, Sydney Road, Enfield, Middlesex. Tel: 01-366 1234.**

EASTERN GAS

OVERSEAS OPPORTUNITY

Systems Analyst Programmer

£16,000 and Negotiable
Tax Free plus many Additional Benefits

Preferably with experience of CDC 1700/Assembler and PDP 11/35/Fortran — RSTx/11M. Must have experience of process control applications relating to oil pipeline control systems. Ideally with electrical engineering background.

One year contract Libya — 6 home leaves expenses paid.

Programmer

also required to work under the above Supervisor

Experience in Fortran.

Salaries negotiable — £12,000 negotiable. Tax free. Benefits as above.

Contact: Maurice R. Hamlin, Atlas Computer Consultants Limited, Bolton 24117/8/9.

(3721)

Royal County of BERKSHIRE

RESEARCH AND INTELLIGENCE OFFICER

(Computer Programmer)

Career Grade £3990–£6097 (Award pending)

Based in the County Council's Central Research and Intelligence Unit, this officer will join a team working on a wide variety of projects of a statistical/O.R. nature, be expected to contribute to the general work of the Unit and, in addition, carry special responsibility for computing work and advice. The Unit has a V.D.U. link to the County Council's ICL 2976 computer and its own microcomputer system. Applicants should be graduates with a numerate background and experience of computer programming in FORTRAN. Starting salary according to qualifications and experience.

Application forms and further details from the County Research and Intelligence Officer, Shire Hall, Reading, RG1 3EY, or ring Reading 55981 extn. 6. Closing date December 12.

GHANA

Ashanti Goldfields Corporation (Ghana) Ltd.

SENIOR SYSTEMS ANALYST

Applications are invited for the above vacancy which should be of particular interest to computer professionals wishing to progress their career and broaden their experience in an overseas environment.

The present 1901T configuration is in the process of being replaced by a 48K 2904/50, with 3 x EDS60, train printer, magnetic tape and 7502 terminal equipment. I.C.L. 1500 terminals are about to relieve the present card punches and verifiers. Proposed enhancements, due for delivery in 1981, include a further EDS60, an additional 16K store for the 2904, hard copy facilities on the 1500's and a 7700 word processor.

Applicants should have past experience in a similar size installation, where they have had extensive involvement in systems and programming maintenance and development.

The Senior Systems Analyst will be responsible for the design and implementation of system improvements, modifications and development, and will be expected to train local staff in systems design, analysis and implementation.

Experience of working overseas and possession of formal computing qualifications will be an advantage.

Salary is negotiable and conditions of service are in line with modern expatriate practice and include: —

- 5 year contract
- 12 month foreign tours with 2½ months' leave
- Family passages each tour
- Provident, gratuity and life assurance schemes
- Staff primary school/education allowances
- Free furnished accommodation
- Good sporting facilities

Interviews will be held in London in early December.

Please write in confidence, quoting reference number V.80 to: —

Group Personnel Manager,
LONRHO LIMITED,
Cheapside House, 138 Cheapside, London EC2V 6BL.

(3712)

PROGRAMMERS

London IBM Cobol/PL1/Mark IV

Tel: Roger Barnes on 01-628 4200
4&6 Copthall Avenue, EC2R 7DA

SIDA

PROGRAMMER

£Negotiable — MIDLANDS — C469

Minimum of two years' Basic and Machine Code programming. Ideally on Micro Computers. Applied to Business Packages, including Sales Ledger, Wages, etc. Bureau environment.

SENIOR SYSTEMS ANALYST

To £9,000 — WARKS. — C470

Minimum of five years' Analysis, including Production Control Systems. Experience of Database or DL1 a decided advantage. Manufacturing environment.

SENIOR PROGRAMMER

£6,500-£8,000 — WARKS. — C471

Two years' minimum Cobol programming, preferably on IBM hardware under DOS/VS. Database or CICS experience an advantage. Manufacturing environment.

ANALYST/PROGRAMMER

To £7,000 — NOTTS. — C472

Experience of Cobol programming on ICL mainframe computers. Application areas include Insurance and Sales Processing.

SENIOR SYSTEMS ANALYST

£Negotiable — LEICS. — C473

Minimum two years' experience of On-Line Commercial systems. A knowledge of IMS and TSO desirable. User contact.

SYSTEMS ANALYST

£7,000-£7,500 + Bonus — SOMERSET — C474

At least two years' Analysis experience, preferably coupled with Database. Knowledge of both Mini and Mainframe hardware a decided advantage. General Commercial and Financial applications.

Contact: Roger Carr

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North Kent — **Circa £9,500 + car**

As a medium sized group of companies, our client is seeking an experienced analyst/programmer to take responsibility for their IBM System 34 installation, at present located in North Kent which will service five on-line locations.

It is anticipated that the successful candidate will have the ability to implement existing bespoke package systems and become highly involved in future developments including systems enhancements and expansion. The person appointed will be given responsibility for general operation, servicing of user departments and training as well as the duties normally associated with the role of Analyst/Programmer.

Reporting to the group finance director, the DPM will ideally have a programming background with RPGII and at least 2 years systems experience in a small machine environment. The successful candidate should be able to show a sympathetic understanding of commercial user requirements whilst ensuring cost effective solutions to administrative and operational problems.

Please telephone (24 hour answer service) or write to apply. Quote Ref: CW165-F.

CAPP ASSOCIATES 01-686 9693
Computer and Professional Personnel Consultants
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CONTRACT REQUIREMENTS

SYSTEMS ANALYST — MIDDLESEX

Analyst with preferably but not essentially manufacturing experience to start in January '81 for c4 months.

2 RPG PROGRAMMERS — MIDDLESEX

Good RPG experience required on IBM equipment, knowledge of Cobol useful but by no means essential. c 6 months.

IBM SYSTEMS PROGRAMMER — CITY

Must have in depth CICS/Assembler experience to start ASAP. Length of contract yet to be determined.

PROGRAMMERS — MIDDLESEX

Must have good CICS/DLI/PLI experience. 2 to start in January and 2 in February.

PROGRAMMER — BERKSHIRE

Experienced CICS/COBOL programmer required to start ASAP.

Contact Daphne Jones

FORCE 8 Computer services
8 Mint Walk, Croydon. 01-680 3761

Engineer-Analyst

c. £8,500 negotiable — HORSHAM, Sussex

Electrowatt Engineering Services is a large international firm of consulting engineers active world-wide in power generation and associated energy supply projects. The UK subsidiary is seeking an additional Engineer-Analyst to participate in varied engineering assignments, many of which have a significant analytical content.

Applicants should have good academic qualifications in either an engineering subject or in mathematics and a strong computational background. About 5 years experience in either a research, analytical support team, or an engineering environment would be suitable. An ability to write and maintain sometimes complex Fortran programs, together with an interest in working within a multi-disciplinary engineering team, are essential.

We are able to offer a professional and stimulating working environment in a very pleasant part of the country. An attractive salary, which will depend upon qualifications and experience, is supplemented by fringe benefits which include a non-contributory pension scheme and a generous holiday entitlement.

Please send a brief summary of qualifications and experience, quoting reference CWAW/1, to:

Electrowatt Engineering Services (London) Ltd., Grandford House, 16 Carfax, HORSHAM, West Sussex RH12 1EB.

PL/1 PROGRAMMERS	£8,000-£8,000
BL/1 ANALYST PROGRAMMERS	To £7,000

East Surrey - Enfield and City

Programmers with upwards of 1 year's experience and the Analyst/Programmer must have at least 2 years' programming in PL/1 with some experience of Systems Analysis with potential to progress within a large company environment.

ANALYST/PROGRAMMERS — £6,500-£9,000

London and Home Counties

Analyst/Programmers are urgently required by several of our clients in Central London, Surrey, Sussex, Middx., Berkshire and Essex. Experience of programming must cover at least 2 years and analysis of 1 year. Language required is mainly COBOL. Please telephone and find out if we have a vacancy in your location.

SYSTEMS ANALYSTS — £8,000-£9,500
PROGRAMMERS — £6,000-£8,000

London - Surrey, Berks., Middx., Essex

Vacancies are available for Systems Analysts varying in experience from 1 year to 5 years. The senior positions will require experience of having completed a project.

The programmers must have at least 1 year's experience of programming mainly COBOL although other languages will depend on the area you wish to work in.

If you are interested in any of the above positions, please telephone for an application form or send us your full career details.

AMES PERSONNEL
Employment Agency Suite 14 Dryden Chambers, 119 Oxford Street London W1R 1PA. Tel 01-434 1106

Systems Programmer Bahrain

The expansion of the Group's data processing activities calls for the appointment of a Systems Programmer to be based in Bahrain with visits as required to the Company's other Gulf DP centre, at Doha for overall installation/maintenance responsibility of IBM system software at the two Branches.

Applicants should have had at least 4 years experience in data processing with at least 3 years spent on IBM system programming covering full responsibility for major software product installations e.g. DOS/VS or CICS. Experience of DOS/VSE, APL and 8100 software products would be particularly relevant.

2 year Contract including:–

- Attractive tax free salary
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SNR PROGRAMMER HERTS — c. £9K

Senior Programmer required by large IBM and Mini user for newly-created technical support role — experience of CICS, DL/1 and JSP desirable. Responsibilities include involvement in Systems Design, standards, etc. Large company benefits apply.

GERMANY IBM — £12-18K

Analysts and Programmers wanted to work on IBM compatible systems at European division of leading Computer Systems Manufacturer. The requirement is for Assembler, TSO and IMS/DC experience. Relocation assistance and excellent benefits package.

FRANCE COBOL — to £18K

IBM COBOL and PL/1, minimum 4 years' experience with knowledge of IMS, DL/1, CICS a considerable advantage, wanted for projects being operated by British Systems House in France. Relocation offered.

PROCESS CONTROL — £7-10K

Programmers and Analysts with 3+ years' mini or micro Assembler *(DEC in particular) experience plus* relevant (i.e. scientific) degree required for producer of Industrial Control and Automation Systems. Offices in Herts.

2900 VME/B — to £12K

Analyst/Programmers, and Analysts, COBOL programming background, *required for new project* being undertaken by Systems House in Central London. 2 or more years' experience in large ICL 2900s under VME/B required.

MIDDX - COBOL — to £10K

Programmers, Analysts and Team Leaders with COBOL experience and, ideally, some knowledge of structured programming techniques, required to meet expansion plans for development centre of leading manufacturer. Degree preferred, no specific h/w background but commercial/financial applications experience necessary.

MACRO II — to £10K

Programmers and Analyst/Programmers with 2+ years' Macro II wanted to join young but rapidly growing Software House. Projects are technical, scientific and military, so knowledge of CORAL, Fortran, etc., is an advantage. Offices in London, projects in diverse locations.

MATRIX — 10 Grenville Place, London SW7 4RW — 01-373 3063
D.O.E. Lic. No. SE(A)4127 — to 8.30pm 7 days a week

Systems Programmer Univac 1100

required to join a small team at our Harlow office providing system software support for our Univac 1100 series computer supporting batch, interactive and on-line operations.

A good working knowledge of Univac Exec 8 and specific experience of at least one of the following items of Univac software is necessary: Exec 8, Fortran, COBOL, TIP/CMS or DMS.

Candidates should preferably be educated to degree standard or equivalent and have around 4 years' experience in a Univac systems or application programming environment. Assembler coding and systems software dump analysis experience is desirable.

The starting salary is in a range to £12,000 and the excellent terms and conditions of service are those expected of a major international company.

Please write or telephone for an application form to: R. D. T. Lecky-Thompson, Personnel Co-ordinator, The British Petroleum Company Limited, BP House, Third Avenue, Harlow, Essex CM18 5AG. Tel: Harlow (0279) 28851, ext. 2821.

BP Harlow

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The position is within the Project Finance Division of a

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They will pay

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The applications are in state-of-the-art

Financial Analysis

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If you are in your twenties, probably a graduate, with a sound knowledge of Fortran, and a strong desire to put this experience, and your native intelligence, to profitable use; if you are numerate, articulate and keen to learn; if you are capable of thoughtful and creative analysis in developing systems, and quick on your feet in using them; and if you would like an interesting and challenging job with excellent career prospects,

Then

apply soon, with a resumé of your career and experience to date, stating the name of any organisations to whom you would not like your application to be forwarded, to:

J. D. Vine, Account Director (Ref: CRS/188)
Lockyer Bradshaw & Wilson Ltd.,
North West House, 119-127 Marylebone Road, London NW1 5PU

LBW

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MIDLAND RECRUITMENT FEATURE

Advertisers are reminded that the next Computer Weekly area feature will be published on December 4th and will highlight career opportunities in the Midlands.

Space reservations should be made as soon as possible to:

Vic Sharet — Birmingham — 021-356 4838
Julie Hannaford — London — 01-661 0121

Copy Deadline: PM Friday before

COMPUTER WEEKLY

THE INDUSTRY'S WIDEST READ AND MOST REQUESTED NEWSPAPER

Recruitment LOGISTIX In Informatics

Jnr. Applications Progs.

Rhineland Germany: Salary £16K

A German Chemical and Pharmaceutical Company has requested LOGISTIX to identify and recruit Applications Progremmers and Analyst/Programmers for its recently upgraded IBM installations. The Company is situated in an area of outstanding natural beauty and within three hours' drive of six neighbouring countries!! It is essential that all applicants have a minimum of 2 years' COBOL, Assembler or PL-1 programming experience although the hardware involvement is irrelevant, since excellent in-house training and manufacturers' courses will be provided. The Company is planning to implement an SNA network during the next 2 years and you will therefore be daily involved in development work. These positions represent an outstanding opportunity for career-minded professionals aged 23-28 years to enhance their technical skills whilst simultaneously enjoying the diverse cultural benefits of another society. Ref. L/48/A

Operating Systems Specialists

Herts: Salary to £11K

Systems Programmers and Software Development Engineers are required to join a recently formed project team to develop and support a new operating system. Both positions demand previous software experience in the areas of compiler development, data communications and systems generation. A proportion of the work function involves supporting both existing and new clients in the installation and tuning of new software releases. Consequently, our client will seek a degree of personal communication skills in all respondents. Whilst these positions carry either a car or car allowance, it is expected that successful candidates will enjoy — indeed thrive upon — both national and international travel. These positions represent an outstanding opportunity to join a Company whose products are in great demand and therefore early promotion is a distinct possibility. Ref. L/48/B

ICL Applications — Canada

Full Contract Package

We are seeking several Programmers and Analyst/Programmers for 6 months' renewable contract positions in several Canadian Provinces (not East Coast locations). The required programming skills are: ICL 2903-S or ME29 COBOL with either MTS or IDMS software experience. The applications are inventory/stock control and order entry processing. Previous programming development in these areas is an obvious asset. In addition to an excellent contract rate, accommodation and travelling expenses will be paid. Initial interviews will be held within seven days of the appearance of this advertisement. Late 1980/early 1981 start dates are envissged. Ref. L/48/C

Pascal & ADA

Thames Valley & London: Salary to £11K

Pascal and ADA have a great future. If you want to participate in the realisation of their commercial potential, please read on ... Our client, an expanding Software/Systems Supplier is based on the edge of The Chilterns in an area of outstanding natural beauty. Current requirements are for Program Engineers and Software Designers who can offer a combination of academic achievement and practical exposure to both software and firmware orientated projects. Suitable candidates should have a real demonstrable interest in PASCAL compiler development or have participated as a team member in the evaluation of ADA and similar hybrid languages. Interviews will be held in early December and offers made seven days thereafter. Ref. L/48/D

Communications Software

W. Germany: Pkg. to £18K

An established world leader in telecommunications products is seeking to recruit Communications Software Specialists to join existing project teams at its R & D Headquarters in Southern Germany. At least two years' experience in the design and development of specialised software for PBX or PABX systems is essential. Applicants who are also able to demonstrate a knowledge of digital hardware concepts will be particularly welcome, as will those with experience of programming around Intel 8085/6 microprocessors. Successful candidates will, in addition to a competitive salary, receive relocation expenses and an attractive benefits package. Ref. L/48/E

Commercial Systems

West End & City: Salary to £11.5K

A leading International Systems and Software Consultancy with offices throughout the U.K. has recently gained several new contracts in the London area. Additional Senior Programmers and Analyst/Programmers are required to join specialist project teams engaged in the design and implementation of commercial systems on client sites. Applications areas include Accounting, Stock Control, Order Entry, Banking and Insurance. Candidates should have a minimum of three years programming experience and preferably have a knowledge of COBOL or Assembler. Particular hardware involvement is not important, but is is essential that all applicants demonstrate the ability to adapt easily to new hardware and software. Ref. L/48/F

Mini/Micro Assembler

Holland and Italy: Pkg. to £15K

One of Britain's leading Systems and Software Houses, with a substantial overseas presence, urgently requires Programmers and Senior Programmers to join existing project teams operating from its Dutch and Italian offices. The more junior posts are open to those who have been programming in a real-time environment for at least 18 months. Applicants for the senior positions will be required to offer a minimum of 3 years' programming experience combined with actual or potential managerial skills. Particular hardware exposure is not a limiting factor but preference will be shown to those familiar with either PDP/11 or microprocessor-based systems. Ref. L/48/G

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Being involved for sometime in both the creative and practical spheres of the now well published mini/micro computer era puts us in a strong position to succeed in this market sector. We now wish to enhance this position by increasing our penetration in the North of England.

Needless to say you will be negotiating at Board level, although your communication skills will be in demand throughout the management spectrum. The ability to recognise potential computer application areas in manufacturing and industrial environments should be well developed as will your expertise in preparing meaningful technical proposals.

You need to be a mature self motivated sales professional well able to identify sales opportunities. However it is stressed that you must have experience in applying micro and mini computer control systems within the manufacturing and process industries

In return we offer a highly professional small team environment with visible opportunities. A rewarding career is waiting for the right person with a commitment to succeed.

For an immediate and strictly confidential interview please contact our Advising Consultant

ON [illegible] (24 hour answering service)
OR 021-420 1574 (evenings & weekends)

Initial interviews will be held in Manchester, Birmingham or London. If preferred, please send your Curriculum Vitae to Birmingham Office; confidentiality is guaranteed.

London 01-935 0671 3 Mandeville Place, Wigmore Street, London W1M 5LB
Birmingham 021-236 3761 35-37 Great Charles Street, Queensway, Birmingham B3 3JY
Manchester 061-833 0427 Blackfriars House, The Parsonage, Manchester M3 2JA
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If you have the relevant experience but are unsure of life and facilities in Abu Dhabi or uncertain about contracting in general please either phone Paul Ratcliffe in the Stoke office or call into either of our offices for an informal chat.

The above positions to start throughout the New Year with long + lucrative contracts.

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Database design, on-line system design, very senior, therefore very high rates.

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If you have experience with any of the following: IBM Cobol, Assembler, SPPS 2, PLDS, IMS, DPPX, TSO, SPF, MVS, NCP, and are our sort of person, we can, here and now offer you real career advancement.

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Tesco House,
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Cheshunt,
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Tel: Waltham Cross 32222.

TESCO

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RESEARCH IN HIGHLY PARALLEL AND DISTRIBUTED COMPUTING SYSTEMS

Applications are invited for the position of Research Associate with an on going project at the Computing Laboratory, University of Newcastle upon Tyne. The project has led to the development of a novel high system design notation called COSY which has been used to develop highly parallel and distributed system strategies for the sharing of storage and processing power. A formal semantics associated with the notation has been developed to the point where characteristics such as freedom from deadlocks can be largely certified at compile time or at programme formulation time.

A successful candidate for the position would be expected to concern himself with the problem of directly implementing the COSY notation in such a way that COSY programmes would run without loss of concurrency or distribution. Candidates should, therefore, have a Ph.D. or equivalent practical experience in compiler writing (preferably verifying compilers) and operating systems programming (preferably for concurrent and distributed systems).

Appointment will be until 31st December, 1981, commencing as soon as possible, and salary will be at a point within the range 1A scale £5,505-£0,895 per annum.

Applicants should forward a brief résumé (three copies) together with the names and addresses of three persons to whom reference may be made, to Dr P. E. Lauer, Computer Laboratory, University of Newcastle upon Tyne NE1 7RU, not later than 12th December, 1980.

(3733)

Use your skills to better effect

Experienced Programmer/Analyst? Then move to Minerva Computer Personnel and earn what you're really worth.
Join us and you'll enjoy excellent pay and real job satisfaction.
There's a wide range of interesting short/long term contract assignments available as well as a variety of permanent positions throughout the UK.
Contact Maureen Ingle or Ian Richardson on 061-236 7036.
Minerva Computer Personnel,
Fountain House, 81 Fountain Street,
Manchester. M2 2EE.

Minerva Computer Personnel (Recruitment Consultants)
A division of Hoggett Bowers & Partners Ltd

(3753)

TECHNICARE INTERNATIONAL LTD.

has the following overseas vacancies:

FIELD SERVICE ENGINEER

c. £12,000 + Allowances

Technicare International Ltd wishes to employ an engineer to maintain a microprocessor-based Supervisory Control and Data Acquisition System which has been installed by our client, a major European oil company, in an attractive Gulf state.

The position will be filled by a man who will be seconded for a minimum of one year on bachelor status with generous leave.

Technicare will also be interested to hear from the following to fill possible vacancies in the New Year:

1. Computer engineers with DEC experience;
2. Fortran Programmers with experience of Navigations Systems for possible employment in the U.S.A.
3. Computer Technicians with microprocessor experience, preferably Redifon.

Please apply for Application form:
Technicare International Ltd., 1 Northbrook Place, Northbrook Street, NEWBURY, Berkshire RG13 1BR. Tel. Newbury (0635) 32200.

(3730)

WEST LONDON COLLEGE

We teach the Royal Society of Arts Computer Operations and Computer in Data Processing syllabuses and require a Lecturer for SATURDAYS ONLY.

Please telephone:
MR. A. COOKE, 01-631 3171

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datascene

RPG II ANALYST-PROGRAMMER

LONDON CITY — IBM SYSTEM 34 — to £10000

This merchant bank based in the City of London require an Analyst/Programmer to define and implement banking systems which will be based on the IBM system 34 computers. The ideal applicant will have a banking background and at least three years' total experience which will also include one system from feasibility through to implementation.
This is an excellent opportunity for progression to senior management. As one would expect from a leading bank the benefits package is second to none and includes staff restaurant and subsidised mortgage. Ref. M4812

SENIOR ANALYST

CITY — ICL 2904 — £10000

A long-established shipping company needs a Senior Analyst who can combine in-depth D.P. knowledge with a sound understanding of business and the ability to plan and lead.
Candidates should have at least five years' experience which will ideally have been gained on ICL machinery working on commercial or financial applications in a senior capacity. They should be strategists who can evaluate both hardware and software. A knowledge of communications systems on-line working and word processing would be useful. An excellent benefits package is offered. Ref. D4650

RPG II PROGRAMMERS

MIDDLESEX — IBM SYSTEM 38 — £8000

A good opportunity has arisen for RPG II programmers with at least one year's experience to join on expanding department based on the West London/Middlesex borders.
An IBM System 38 is due for delivery in 1981 and prior to this existing systems are being enhanced in preparation for the new machine. Systems are currently being run on system 3/15 and system 34 computers.
Company benefits include subsidised restaurant, social club and discount on audio and visual products of the company.

ANALYST PROGRAMMER

W. LONDON — IBM 4341 — c. £9500

A well-known company in the leisure industry seeks a Senior Support Analyst Programmer for a challenging role comprising complete analysis and implementation as well as troubleshooting.
The hardware comprises twin 370 machines to be updated to 4341 supported by DOS/VS, CICS/VS and POWER VS with almost 100 terminals.
Candidates will have at least three and preferably four-five years' experience and will be self-motivated with CICS/VS experience.
In return the company offers subsidised restaurant, pension scheme and season-ticket loan. Ref. D4781

ANALYST/PROGRAMMERS

CITY — PROGRAMMERS — £10000

Two international banks are looking for staff to complement their existing teams. Both departments utilise DEC-PDP-11 equipment providing REAL-TIME and batch systems to support the banking operations. AIMS or BANKING experience is essential and the successful applicants can look forward to working in a modern and sophisticated environment offering the usual excellent fringe benefits, which will include mortgage subsidy and season-ticket loan facility.

SENIOR PROGRAMMER

ESSEX — SYSTIME — to £8500

A leading insurance broking company require a SENIOR PROGRAMMER. This is an excellent opportunity to work in a modern and progressive company offering an enviable benefits package which includes FLEXITIME and ANNUAL BONUS. Applicants will have had at least three years' BASIC + experience working to good standards and be capable of leading others. It is essential that SYSTIME or DEC equipment running under RSTSE, RSX or RSM has formed all or part of this experience. Ref. R4786

PROGRAMMERS

CITY — BURROUGHS — £6-£9000

A successful City-based computer bureau utilising medium sized BURROUGHS equipment has opportunities for all levels of programmers.
Applications are invited from programmers with BURROUGHS, COBOL and ideally DATABASE experience. If this has been gained in a bureau or software house environment so much the better. The chance to develop your experience in a wide range of application areas together with excellent prospects is offered and the company also provides a comprehensive benefits package which includes car parking and season-ticket loan.

ANALYSTS

SURREY — IBM 4341 — £8500

An insurance house in North Surrey needs Analysts to complement their team working on IBM machines with CICS and DL1.
A minimum of two years' experience in analysis is required for the junior position where candidates should have worked, preferably in an Analyst/Programmer role.
The more senior position requires 4-5 years with an accounting background. In return the company offers free life assurance, flexitime working, company pension scheme and a subsidised restaurant. Ref. D4715

The above vacancies are only a small selection from those currently on our files and we are always delighted to talk to experienced systems and programming staff wishing to further their careers.

(3738)

Datascene International Limited,
Sceptre House,
169-173 Regent Street,
London W1R 7FB. Telex: 25851.

01-439 7871
24 hour answer phone

New and Challenging Opportunities...

...For Marketing and Support People

The company is one of the largest and fastest growing manufacturers in the systems business. It already enjoys a tremendous reputation in the DP and WP field, and sees the future as the uniting of these current technologies together with telecommunications etc. into a fully integrated information system.

A new, powerful marketing team is to be formed to ensure this technical concept is a business success. The head office and field support teams are being extended to make an idea a reality.

The creation of the marketing team offers unrivalled opportunities for marketing, sales or sales support professionals to advance their careers. Similarly the extensions to the support organisation offer the right people the opportunity to develop still further and share in the company's success.

Product Marketing Specialists

£15,000-17,000 Pkge + Car

Reporting directly to the U.K. Marketing and Support Manager these are key positions, interfacing with the U.K. Sales Force and the U.S. Corporate Marketing Division, maximising market penetration and optimising product acceptability. Responsibilities will include U.K. product announcements and launches, supporting documentation, pricing policy, U.K. specific requirements etc. A specialist, probably in the age range 27-39 will be recruited with clear responsibilities in the following, three product areas:-

1. **Virtual Storage Computer Based Products**

   These are technically advanced data processing products capable of supporting sophisticated communications networks, word processing, electronic mail etc. Candidates should have strong DP backgrounds, marketing, sales or sales support experience, hopefully exposure to IBM equipment and telecommunications, plus the personality and determination to succeed - by helping others succeed.

2. **Word Processing Based Products**

   Already a world leader in W.P. the company is pioneering the integration of W.P., D.P. Photo-typesetting, Telecommunications, etc. Again, applicants should have relevant technical backgrounds plus marketing or sales experience, with the right personal attributes for success in marketing.

3. **Small Business Systems**

   Here the emphasis is on the marriage of hardware and application software to solve today's defined business problems. Applicants should have marketing capabilities, a good understanding of business and applications packages and the market's requirements in this area. Experience in a software house could be an appropriate background.

Strategic Marketing Analyst

£10,000-15,000 Pkge + Car

Again, reporting to the U.K. Marketing and Support Manager, the incumbent will study the market, estimate its potential and the company share, identify and analyse the competition, advise on product pricing and contribute positively to the success of the company's products in the U.K. market. Applicants should have relevant market analysis skills, business awareness, the intellectual ability and judgment to make the right recommendations from incomplete data.

Virtual Computer Product Consultant

£10,000-13,000 + Car

A member of the Head Office Technical Support Team, this is a technical role, providing a centre of competence in the organisation for virtual machine products. You will work closely with the Field Support Team but also provide advice to the Product Marketing Specialist. Probably aged 23-36, applicants should have strong technical backgrounds, ideally including IBM DP and telecommunications products.

Branch Support Analyst

£10,000-12,000 + Car

Essentially post-sales support work; applicants will require in-depth knowledge of teleprocessing systems, particularly in conversation with IBM hardware and software. There will be a great deal of customer contact, previous experience with a manufacturer or consultancy would be advantageous, as would knowledge of word processing equipment.

Please telephone (24 hour answer service) or write. Quote Ref: CW 162-T

Computer and Professional Personnel Consultants

CAPP ASSOCIATES

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AMP House, Dingwall Road, CROYDON CR9 9X

Account Managers c. £17,000 + 2 litre car

WORD PROCESSING FACSIMILE BUSINESS SYSTEMS

Our client, Nexos (United Kingdom) Limited, is expanding very rapidly in the growing market for electronic office systems. They are poised to take an important share of this market with a unique range of products which includes a new screen based stand alone word processor and small business system. If you enjoy and can respond to a fast moving environment there has never been a better time to change direction and join a very successful company which is headed for market leadership.

Applications are invited from candidates with a proven record in selling office equipment or business systems to major accounts in industry, commerce (including financial organisations) or the public sector. The job demands above average energy combined with good business judgement.

After a comprehensive training, successful applicants will be given an unparalleled opportunity of broadening their product and application experience, while capitalising on their existing skills to the full. The company is committed to providing extensive and effective sales support as well as a challenging management career path.

There is no ceiling on earnings which include a high basic salary with a guarantee in the first year. The quota is realistic and attainable.

For a confidential discussion, call Peter Lloyd on 01-734 9035 or write to:

NEXOS

A&A Consultants Limited
Management & Recruitment Consultants
Princes House Suite 407,39 Jermyn Street,
London SW1Y 6DT Tel: 01-734 9035

Our clients are equal opportunity employers

13748

Applications / Software Programmers

HEADQUARTERS - BELFAST

Vacancies exist for the above posts in the Management Services Group Headquarters and will involve applications in both the Commercial and Engineering fields. Short-term plans include the implementation of VME/B resulting from the computer installation having recently been upgraded to an ICL 2960 with EDS 200s at Headquarters.

Communications facilities with mainframe currently include local 7502s and minicomputers at remote locations. Distributed processing is currently under development.

PREFERRED STANDARD
A minimum of 3 years' ICL Cobol experience.
A knowledge of PLAN G2+ VME/B and Communications Software would be an advantage
Degree/HND or equivalent standard in Computer Studies.

SALARY RANGE
£7,210-£8,865 per annum. Usual fringe benefits associated with a large organisation will include excellent pension scheme, annual holidays of up to 26 working days and flexible working hours.

For further information and application form, write or contact the Personnel Resources Manager, Northern Ireland Electricity Service, Danesfort, 120 Malone Road, Belfast, BT9 5HT (Telephone Belfast 668899).

Completed applications to be returned no later than Friday, December 12, 1980.
Please quote reference VS103.

Northern Ireland Electricity Service

07288

ANALYST/PROGRAMMERS

London IBM Cobol/PL1/Mark IV

Tel: Roger Barnes on 01-828 4300
[illegible] Capital Avenue, EC2R 7LH
(2123)

SIDA

Excellent Contract Opportunities

The following are a selection of our current contract assignments. However, we have a continuous requirement for skills and dedicated contract professionals, so please make sure you are on our Register.

U.K. ASSIGNMENTS

H.P. 3000	ANALYSTS/PROGRAMMERS	LONDON
I.M.S./DL1	DATABASE DESIGNERS	N. ENGLAND
UNIVAC/DMS 1100	DESIGNERS/PROGRAMMERS	N. ENGLAND
PRIME/(DBMS preferred)	SENIOR PROGRAMMERS	LONDON
BANKING	ANALYSTS	LONDON
IMS DB, DL2	SENIOR PROGRAMMERS	LONDON
MARK IV	ANALYSTS/PROGRAMMERS	LONDON

OVERSEAS ASSIGNMENTS

IBM/ASSEMBLER	ANALYSTS/PROGRAMMERS	U.S.A.
IMS/MARK IV	ANALYSTS/PROGRAMMERS	U.S.A.
MARK IV	ANALYSTS/PROGRAMMERS	U.S.A./EUROPE

For more information telephone
Alan King
Tangent Computer Service
102/108 South Street
Romford, Essex.
Tel: Romford 760201

07481

REMOTE CONTROLLED SUBMERSIBLES

SUB SEA SURVEYS is Britain's leading remote controlled submersible operating company, providing underwater inspection, maintenance and survey services to the offshore industry in Europe and overseas. Applicants should have appropriate qualifications and preferably relevant experience or interest to offer.

HARDWARE ENGINEERS

PDP-11, LSI-11, HP-9800

Maintenance and development of vehicle control and data capture systems.

SOFTWARE PERSONNEL

MACRO, BASIC

Development and operation of survey, navigation and control system software.

All Personnel are trained to pilot the company's remote controlled submersibles, working offshore with periods of onshore development work.

SUB SEA SURVEYS LIMITED

SSS

Application forms and details from:
John Dobbie / Marcus Gardow
SUB SEA SURVEYS LTD.,
127 Duke Street,
BARROW-IN-FURNESS,
Cumbria, LA14 1XA
Tel. (0229) 31462.

07276

Coláiste na hOllscoile Corcaigh
University College Cork

DIRECTOR OF COMPUTER BUREAU

The Computer Bureau is operated as a service unit for both academic and administrative departments. Interactive computing facilities are supplied by an IBM 4341 computer with 2-Mb of main memory and Digital Equipment VAX 11/780 with 1 Mb of memory.

In recognition of the increasingly important role of computers and the wider requirements for external services, the College has under consideration a proposal to incorporate a Regional Computing Centre in the Bureau.

Applications are invited for the vacant post of Director. Candidates should have extensive experience in the management of a major computing facility, preferably in an academic or research environment and should also have appropriate professional qualifications. The salary scale is: £14,932-£17,205 per annum.

Further particulars and application form are available from the undersigned to whom completed applications should be sent to arrive not later than Monday, 15 December, 1980.

ESTABLISHMENT OFFICER
UNIVERSITY COLLEGE, CORK
TEL: (021) 28571; FAX: 2232

CONSULTANTS

CITY To £12,500

Graduates with at least 3 yrs. S & P experience for posts in various business sectors. To review installations, through feasibility and valuation, to design and implementation of systems. (NW1295)

S'WARE ENGINEER

MIDDX. To £11,000 + CAR

Degree? Mini/Micro experience? High-level language? Big company background? Then apply to join a growing international company specialising in mini and micro software design and development. Excellent benefits including mortgage subsidy. (NW1135)

PROJECT LEADER

HANTS. To £12,000

Graduate with 2-4 years' experience of MACRO 11 on PDP 11s to work on design and production of software systems for industrial and radar applications. (NW1281)

PROJECT LEADER

S.E. LONDON To £15,000

Senior Systems Analyst for major company. Capable of leading team of analysts, designers and programmers from feasibility to implementation of project. IBM mnin-frame, dedicated minis. Generous package, including relocation. (NW1273)

ANALYST/ PROGRAMMER

SUSSEX To £9,500

2 years' plus RPG2 on System 34. Marketing, finance and distribution experience. Good prospects and promotion could include car. Package includes relocation. (NW1287)

DP MANAGER

ESSEX C £9,000

2 years' Analyst/Programmer. RPG2 on IBM System 3. Familior with financial accounts and seleries. To supervise staff on small site. Bright future. (NW1262)

MANAGEMENT SERVICES MANAGER

HERTS. C £12,000

Our client, market leaders in their field, require a Senior Systems Analyst to lead a highly motivated team of five. You will be involved in high user-liaison contact and accounts and O & M background would be a distinct advantage. (SF1299)

PROJECT LEADER

CITY C £12,000

Brand new project, lasting 5 years, involving some travel throughout the UK and Europe. 5-6 years' on-line experience is essential with and user training, implementation. (SF1296)

SYSTEMS PROGRAMMING MANAGER

BERKS. C £9,500

4 years' experience IBM Systems Programming. To provide back-up support to group locations in evaluation, design, programming, implementation and maintenance. High mobility at short notice required. (SF1298)

PROJECT MANAGER

HERTS. £11,000 +

A large and well-established company in Hertfordshire requires your systems expertise. Business Analysis experience would be an added advantage. Excellent benefits are given. (SF1031)

PROJECT MANAGER

NORTHAMPTON C £11,500

Our clients have new hardware and are embarking on their next development phase. If you are a Senior Systems Analyst or Project Leader now is the time to move to a company offering a challenging future. Take advantage of beautiful countryside, low cost housing, relocation package etc. (JS1145)

CONTRACTS

H66	GL0S	TOS	COBOL
1BM	DOS/VE	CICS	SY/PROG
IBM	MVS		SY/PROG
370	DOS	PL/1 & COBOL	
370	OS	PL/1 & COBOL	
DEC	RSx11		CORAL

SOFTWARE PROGRAMMER

29	VME/B or K	COBOL
U1100	Exec	COBOL

Please John Sharpe

01-404 0152

COMPUTER SEARCH LIMITED

Norwich House, 13 Southampton Place, London WC1

(310)

SYSTEMS ANALYST

West London up to £10K

Our client is a well-known British company operating worldwide, their headquarters are in the West of London and they utilize a large IBM 370 mainframe and mini-computers, with on-line and batch techniques.

Due to their continual development of computer systems, they now require a Systems Analyst. If you have a programming background in a high-level language and at least a year's systems analysis experience, ideally gained in a commercial, financial or manufacturing environment on any mainframe, they could be interested in you!

This an ideal opportunity for the successful candidate to broaden his/her experience working on a wide range of business and technical applications. The company offer structured career development with regular reviews and continued training.

Interested? Contact Lorna Harvey, quoting ref: 1175.

ZEUS-HERMES RECRUITMENT

TELEPHONE 01 388 5011 (24 HOUR SERVICE) OR WRITE (NO STAMP REQUIRED) ZEUS-HERMES RECRUITMENT LTD FREEPOST 20 LONDON W1E 4YZ

MCS

Management Control Systems

The established independent software and systems company need experienced people to work on the specification and development of on-line commercial systems, particularly in the areas of Distribution and Manufacturing.

You will be working in pleasant offices at Ealing, where we have our own PDP11 machine dedicated to development.

You will also be eligible for car options, profit share and pension scheme operated by the company.

Analyst/Programmer

UP TO £10,000

Age 26+. Minimum of 3 years' experience in on-line commercial data processing including Applications Analysis and Programming, using Basic preferably on DEC PDP11 computers.

Programmer

UP TO £8,500

A minimum of 1 year's experience is required on PDP11 hardware, RSTS and Basic Plus.

Please write with your CV to:

Management Control Systems
4th Floor, Bilton House, 54/56 Uxbridge Road, Ealing, London W5 2TJ.
Or telephone (reverse charge): 01-840 3292

3781

OPPORTUNITIES FOR 1981

PDP Programmers

1. Designers — To £9,000
Hertfordshire client developing software products require RSX11M experience.

2. PDP11/34 Programmers — To £8,000
Surrey/Sussex border based company seek experience of PDP applications programming.

3. Software Professionals — £10,000
Hampshire based company developing Control and Radar Systems require 5 years' experience.

4. Systems Programmer — To £10,000
South London, experience of MACRO 11, RSX11M Systems Programming.

5. Analyst/Programmer — To £10,000
Central London based firm require experience of BASIC and communications for software support role.

6. Basic Plus — To £7,000 +
Yorkshire based client requires programmers with BASIC PLUS experience for commercial applications.

7. Consultants — To £12,000
London based major Software House, require 10 years' System Design and Programming experience for communications systems.

8. Real Time Programmers — £9,000
Surrey based company requires minimum of 3 years' experience of Real Time Programming on PDPs using MACRO 11 or RTL2.
GW31

Software Engineers

1. Software Designers — To £10,000
West Midlands based firm require Designers to develop military systems using CORAL and FORTRAN.

2. Software Engineers — To £11,000
Middlesex based consultancy require minimum 5 years' software design including PDP or GEC 4000 series.

3. Real Time Programmers — £ Neg.
West Country based company require experience of Operating Systems, and communications for advanced technology.

4. Software Engineers — To £10,000
Essex location. Engineers required for major communications project with DEC and CORAL experience.

5. Design Engineer — To £10,000
Sussex-based firm require experience in high level languages for Aircraft Simulation.

6. Senior Engineers — To £10,000
Berkshire based, 5 years' experience plus degree. Real-time operating systems, compiler writing.

7. Micro Development — To £9,000
Bedfordshire based firm require Assembler and CORAL for designing and development of micro based systems.

8. System X — £ Neg.
North-West of England based firm require Engineers with Software Communications experience to work on System X.
GW35

Overseas Appointments

1. Germany
German speaking candidates with experience of mini software or micro systems.

2. Germany
Systems Programmer to work on 3031 under OOS/VS. 2 years' experience necessary.

3. Germany
Senior Systems Programmers for large IBM systems. MVS/VS2/SNA/CICS. Munich area, yearly renewable contracts.

4. Germany
German speaking IBM COBOL programmers required to work on large IBM machine under OS. Near Frankfurt.

5. France
IBM Systems Programmers with large machine expertise. Tuning MVS, performance measurement experience ideal.

6. Switzerland
Software Engineers with experience of Process Control to work on Real Time systems.

7. Switzerland
German speaking Technical Writer, to work on Documentation for Real Time telecomms project.

8. Switzerland
IBM Systems Programmers with OS/VS1, CICS and preferably DL/1 for 3031 installation.
GW36

Central Computing Consultants

8a Lower Grosvenor Place, London SW1. Telex 918582

01-834 7105

CCC

Name .....
Address .....
Phone: Home ..... Office .....
Position applied for ..... Ref. .....
Central Computer Consultants
Freepost, London SW1W 0BR
13783

KUWAIT – MINI ENGINEER

c. £12,000 Tax Free + Benefits

A substantial Danish group has a well established computer services operation working in Kuwait and expansion has created the need for a further computer field engineer to be responsible for equipment servicing throughout the country. Installations comprise DEC PDP 11 and Systime CPU's, with CDC disc units and Tektronic/Calcomp graphic display units.

The company provides business computer systems, software consultancy and computer based telephone systems. Experienced engineers with a sound background of servicing these types of hardware will find this an exceptional opportunity to join an effective and expanding European group.

An attractive salary is offered for the area together with a comprehensive benefits package including car allowance, return air fares to home country for 1 month's holiday and free furnished, air conditioned accommodation. The appointment is initially for two years with 4 weeks bonus on completion and the option to continue.

The requirement is urgent and interviews will be conducted in the U.K. week commencing 16th December 1980.

Engineers having relevant experience should telephone immediately to discuss the requirement and how to apply. Either single or married status is acceptable. Please quote reference CW 164-C.

CAPP ASSOCIATES 01-686 9693
Computer and Professional Personnel Consultants
AMP House, Dingwall Road, CROYDON CR9 9XA

Computer Professional Recruitment Consultancy

Our Client, a major supplier of computer hardware and services, is about to implement the U.K. launch of an exciting new Data Entry/Capture System product into both a large established customer base and new/competitive markets. They need immediately:-

MANCHESTER, LEEDS OR BIRMINGHAM based

Data Entry/Capture Sales Executives

On quote £14/£15 k. + initial bonus guarantee.

Selling experience with Key-to-Disc, Remote Data Capture Terminal or Mini-Computer systems.

MANCHESTER, LEEDS, BIRMINGHAM based

Small Systems/Minicomputer Sales Executives

On quota circa £15 k. + initial bonus guarantee.

Selling experience with business-orientated computer systems.

MANCHESTER, LEEDS, BIRMINGHAM based

Technical Consultants – from 9k

Substantial technical expertise in association with Data Entry or Mini-computer hardware and Operating systems. Successful applicants will be involved with the technical spear-head and resulting implementations throughout the U.K.

THAMES VALLEY

ANALYST/PROGRAMMER	£8,400
CONSULTANT	£10,500

Successful since the '60s — a Systems and Turnkey Company handling prestige Mini/Micro projects. They offer variety and multi-disciplined involvement to broaden your experience in Hardware, Languages Techniques and especially, Applications.

If you have 2 to 3 years' experience you will progress rapidly to Senior Engineer, Consultant or Management.

Benefits include: Bonus, car allowance, free lunches, occasional short trips U.K. and Europe, pleasant, convenient location.

Ring for details now. Ref: ER360.

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01-549 6141 (day) 01 644 1595 (after 7.30)
13780

WESPAC CAN YOU SELL?

WANTED: Person with Data Processing background, Operator, Shift Leader, etc.

This could lead to a rewarding career selling Computer Services and supplies, for a fast expanding company.

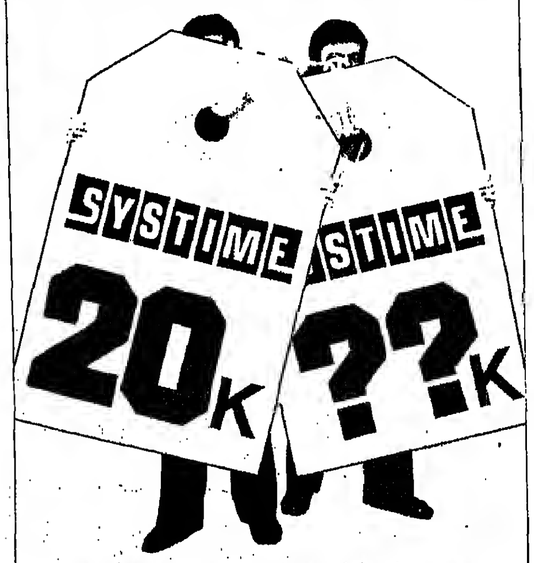
Use your computer knowledge and our sales training to earn good basic + commission + Cortina Estate + pension.

If you are lively, active, hard-working and living in West Midlands, write or telephone:

John A. Kirby
154-168 Shoreditch High Street, London, E1 8HU
Telephone: 01-729 1170

K & J WESPAC
COMPUTER SUPPLIES

WE PUT A BIG PRICE TAG ON OUR COMPUTER SALES PEOPLE



Bright go-ahead people want to be part of a growing company that has proved it's going places.

Systime, in only seven years, have gone from zero to be Britain's number one manufacturer of interactive business systems. No other computer company in the world can match its track record.

And Systime are still on the go. Looking for new, key people in their sales force throughout the UK. The rewards are high, the potential, in a company still young and dynamic, great.

SALES EXECUTIVES

On target earnings £20K

Ideally with experience in selling computers, although a proven track record in selling business equipment would be acceptable. A good basic salary plus generous commission becomes £20K on target. Many of our sales executives earn a lot more. Big company benefits apply including a good company car.

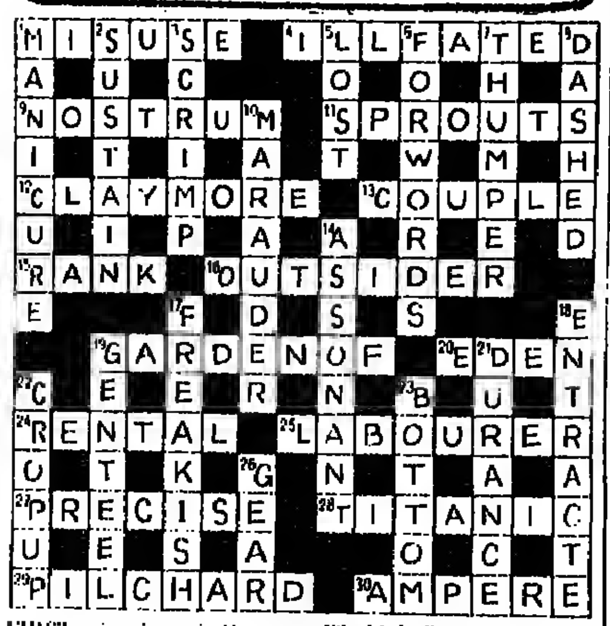
For details contact: Steve Williams on Leeds 702211 (evenings 7pm to 9pm Thirsk 0845-567415) or write with brief career details to:
Recruitment Manager, Systime Limited, Concourse Computer Centre, 432 Dewsbury Road, Leeds LS11 7DF.

Interviews will be arranged on a local basis.

Making Computers make sense.

SYSTIME

CW Prize Crossword 10



FIRST prizewinner in Computer Weekly's Crossword No 10 is David Feltham, a computer operator from West Harptree, Bristol, who wins £10. Joint second prizewinners are Kate Anetts, a senior programmer with the Norwich Union in Norwich, and Susan Jones, a programmer with ICL in Bracknell, Berks. They win £5 each.

Operations Manager

c. £15,000 + car

PA Personnel Services

Communications Hardware Engineer

Our client, a major international banking organisation, is implementing a minicomputer-based, international data-communications network. An outstanding opportunity now exists for a communications specialist to join the bank with responsibility for supervising the European portion of this sophisticated development.

Duties include the supervision of communications hardware installation; maintenance of support documentation covering site manuals, statistical reports, error logs, problem tracking, and inventories; co-ordination of equipment suppliers and the utilisation of technical control/test equipment to diagnose/repair network equipment malfunctions.

The requirement is for five years experience as a customer service engineer with computer based telecommunications systems hardware, knowledge of communications protocols and preferably a working knowledge of systems software and programming. The ability to travel confidently throughout Western Europe is essential. Base location: London.

The excellent remuneration package includes a basic salary which is negotiable around £12,000, profit share plan, BUPA, non-contributory pension scheme, and low interest rate loans for personal, property and season ticket use.

Please telephone, in complete confidence, David May at PDL who will arrange for qualified applicants to meet the bank at an early date.

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Director of Manpower Services

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Salary: Burnham Scale, Lecturer Grade II: £6012 to £9702 per annum plus £759 p.a. London Allowance.

Application form and further particulars are available from the Chief Administrative Officer, Merton Technical College, Morden Park, London Road, Morden, Surrey, to whom applications should be returned within two weeks.

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THE SALES BIT

Changing jobs at management level — Part 2

Thorny path of 'getting ahead'

THERE are two primary considerations a manager should make when contemplating a change of employment.

What type of job is best suited to his or her talents and experience?

Irrespective of present position what kind of company would be most compatible with personal style and career advancement?

A common failing among managers is a tendency to think more about job and less about career than they did before they entered management. "Find me a management job" is not an uncommon job specification.

It is as if achieving managerial status provides a secure career platform where there is little new to learn or achieve. Career development is considered only in terms of "climbing up the management tree".

Little thought is given to increasing demands on capability, experience and character implicit in the route to the top. "As long as one is on the management train, why worry where it's going to!"

Disillusioned

We all have a natural competence ceiling. The trick of being a successful manager is to stay below it, which is much more difficult than it appears.

Egos of many mortals and most managers suggest one is capable of better (usually implying higher) things. One meets many disillusioned managers who have fallen victims of their own propaganda.

On occasions I have candidates who wish to move to a management position in another company and to move to a "higher rank" in the process.

This is particularly true of senior salesmen who wish to move into management, having failed to do so with their current employer.

With the possible exception of an experienced manager within a large company moving to a more senior role in a much smaller organisation, this is virtually impossible.

Risk-taking

It is entirely illogical to expect a company to go outside its own ranks to recruit anyone other than a person with all the experience and skills that cannot be found internally.

To accept anything less would be to install a management trainee and risks of that kind are taken more satisfactorily with an existing employee than a stranger.

Moving as a manager to a small company from a larger one can also lead to unforeseen problems as it is easy to take for granted the facilities and benefits of a large corporation.

I don't refer particularly to personal fringe benefits and social amenities; I mean the lack of assistance in essential areas of activity which could embrace anything from lack of a marketing department to the need to make one's own coffee.

Limelight

The need to become involved in a wider range of activities can bring about the demise of a manager who has no flair for a broader range of responsibilities.

An added problem-cum-opportunity element of moving to a smaller company is the greater exposure such a milieu provides.

One can "keep out of trouble" indefinitely in some larger companies, whereas one's strengths and weaknesses become apparent quickly in a small organisation.

I shall end this theme next week by discussing another kind of job opportunity as well as the financial implications of change.

TRADER

Puzzle Answer

THE rule-of-thumb is: Sum all percentages given (70 + 75 + 80 + 85 = 310), and then subtract 100 times "1 less than the number of percentages" (100 × [4 − 1] = 300). This immediately produces the correct solution of 10%.

Products

Telex-mate

AN intelligent paper tape touch punch unit is available from Midlectron.

Called the Telex-mate, the unit has the ability to convert 5 level to 8 level and vice versa. Connected to a VDU or word processor, the unit allows tapes to be prepared, leaving the telex free for incoming messages.

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Midlectron (CW), Midlectron House, Nottingham Road, Belper, Derbyshire. Tel: (077382) 6811.

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Harris Systems (CW), Harris Semiconductor division, 145 Farnham Road, Slough, Berkshire. Tel: (0753) 34666.

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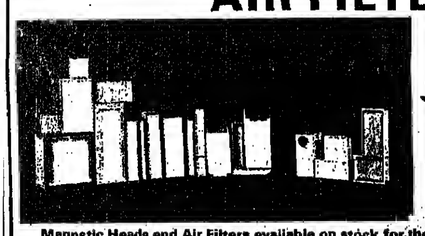

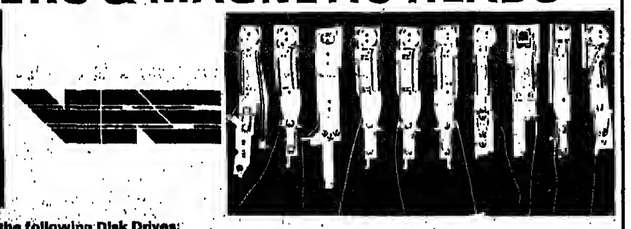

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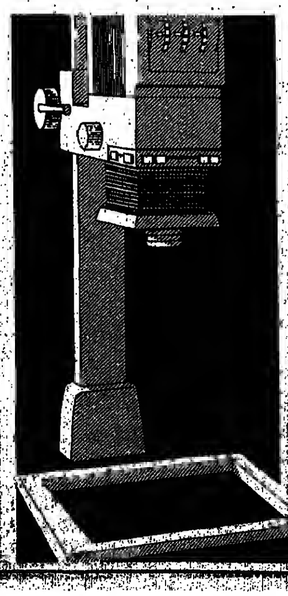

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In this month's Wireless World: a constructional feature for photographers, enabling you to build a unit which will measure the required exposure for any black-and-white print in seconds and tenths, and then time the exposure itself. Also this month: a professional design for a programmable power supply providing 0 to 40V at 2A, controlled via the IEEE General Purpose Interface Bus—an instrument operating as a listener/talker, using an I.s.i. chip. And with Christmas in mind, we've a prize electronics quiz to sharpen your wits just when everyone else's are sinking into a post-prandial torpor!

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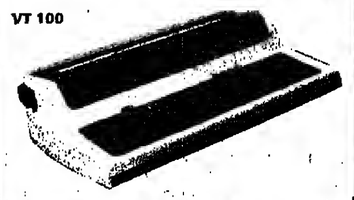

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